

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

DIESEL PROGRESS



FIVE DOLLARS PER YEAR

DECEMBER, 1956

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**"...higher engine
efficiency,
lower fuel and
maintenance costs"**

THE SUPERINTENDENT of this power plant (name on request) reports:

"Texaco Ursa Oil definitely showed superior ability to keep our diesels clean and free from deposits, prevent stuck rings and valves, reduce wear. We . . . have been more than satisfied with the results—higher engine efficiency, lower fuel and maintenance costs."

The superiority of *Texaco Ursa Oil* mentioned above was demonstrated in tests against a leading competitive brand of diesel engine lubricant. It is confirmed by the experience of operators everywhere. That is why—

For over 20 years, more stationary diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.

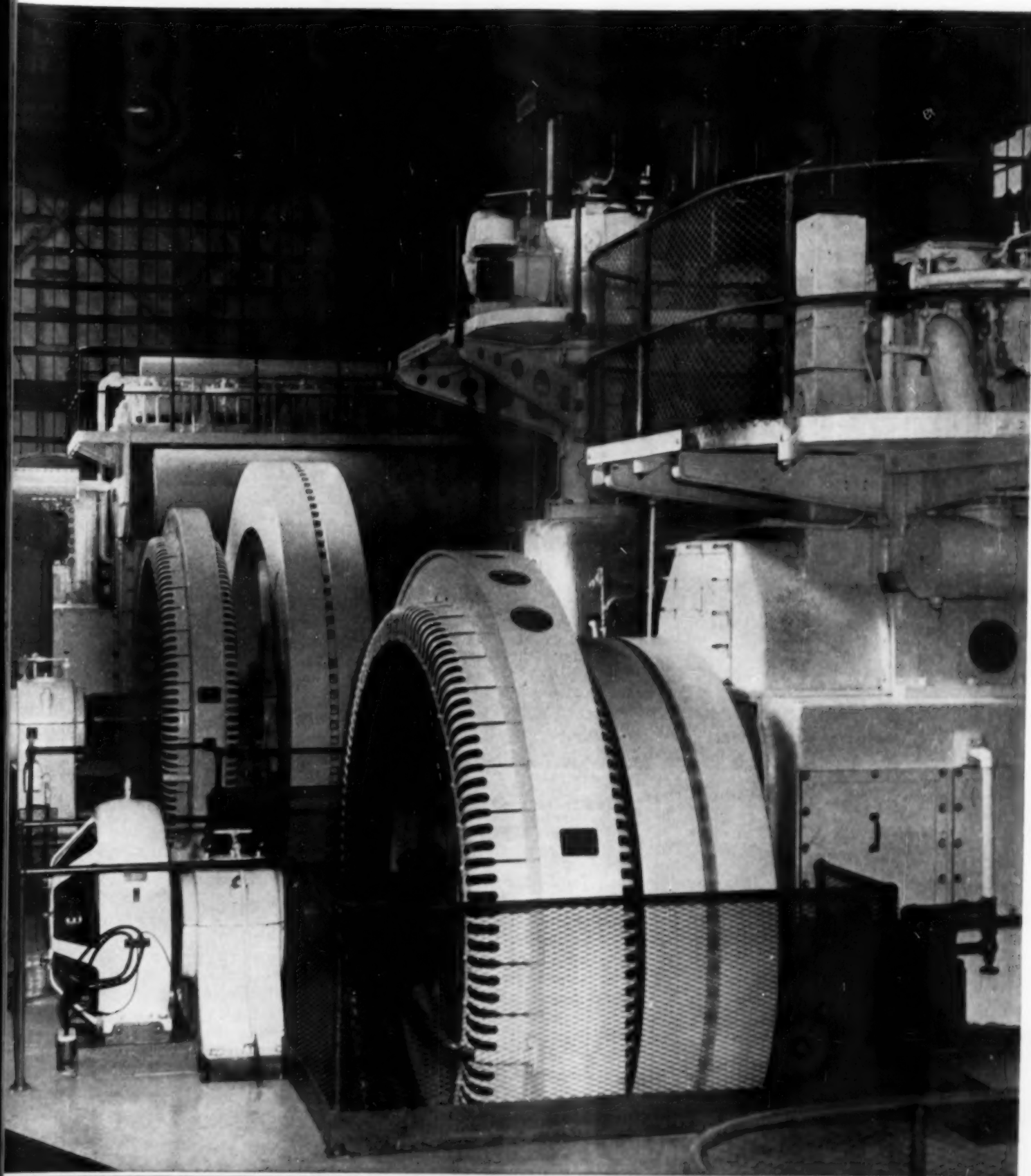
There is a complete line of *Texaco Ursa Oils*—all especially refined and processed to make diesel, gas and dual-fuel engines deliver *more power with less fuel* over *longer periods* between overhauls.

Let a Texaco Lubrication Engineer help you select the one best suited to your engines. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.



TEXACO

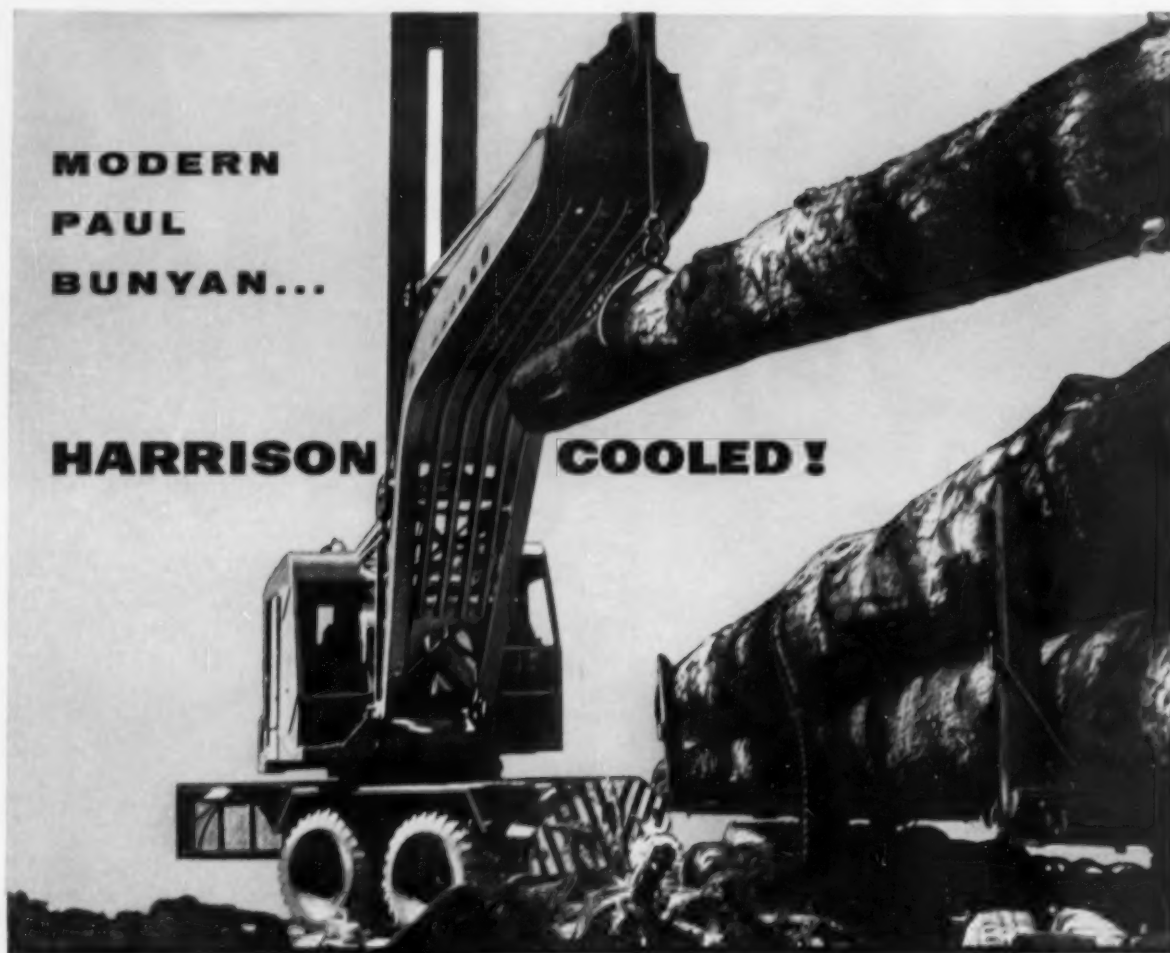




URSA OILS FOR ALL DIESEL, GAS
AND DUAL-FUEL ENGINES

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PAUL
BUNYAN...**

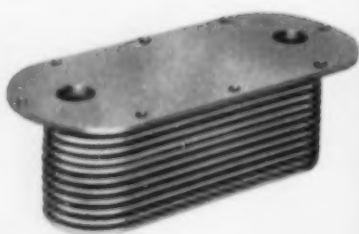
HARRISON COOLED!



**Diesel-Powered Log-Loader
Runs COOL with HARRISON**

Heat-leveller for a mighty lumberman! That's Harrison's job on this Detroit Diesel powered link-belt log-loader. Hoisting huge logs day in and day out is a hot, grueling job. But Harrison's heavy-duty, high-capacity oil cooler holds heat down . . . keeps temperatures level. For temperature control is our business at Harrison—we're specialists in heat control for giant, off-the-road equipment. And that's not all . . . you'll find Harrison heat exchangers on the most advanced aviation, marine, railroad and industrial equipment. If you have a cooling problem, look to Harrison for the answer!

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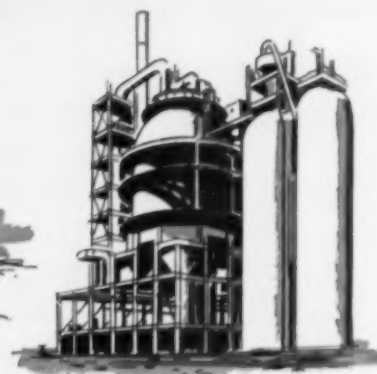
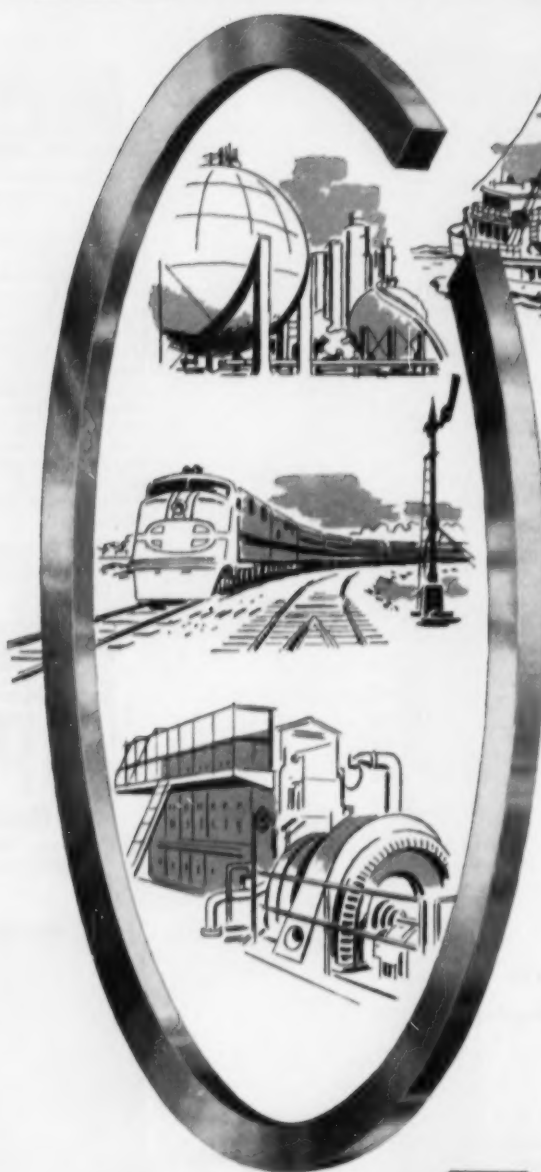
ROCKFORD, IND.:
A. D. Burroughs
R.R. #1



FRONT COVER ILLUSTRATION

Baltimore's new fireboat,
The Mayor Thomas
D'Alessandro Jr., is po-
wered with four Fair-
banks-Morse diesels that
give her the capacity for
throwing 12,000 gpm
while moving at full
speed of 17 mph.

American Hammered Piston Rings . . . field-tested money savers!



Why not specify piston rings that have *proved* themselves? Koppers rings have been saving money and cutting costs for years—throughout the oil and gas industry, the marine industry, on major railroads, all over the chemical field, throughout the aircraft business, in municipal and industrial power plants everywhere—wherever you find gas, Diesel or steam engines, pumps, compressors, forging hammers—*wherever piston rings are needed!*

They're built to take it . . . designed to cut downtime and maintain high compression . . . give longer, more satisfactory service . . . save you money on fuel and lubricating oil . . . *and that's exactly what they do.* And Koppers rings are available in all types, all sizes—from $\frac{1}{2}$ " to 10' diameter—specifically designed for the job they will do in the field where they will be used.

Always specify American Hammered Piston Rings. Benefit from over 100 years of experience in metal products. Use Koppers' complete engineering and metallurgical staff. Get skilled analysis of your specific problem, and prompt assistance. For 16 page Piston Ring booklet write to: KOPPERS COMPANY, INC., *Piston Ring & Seal Dept.*, 1412 Hamburg Street, Baltimore 3, Maryland.

METAL PRODUCTS DIVISION • KOPPERS COMPANY, INC. • BALTIMORE 3, MD. This Koppers Division also supplies industry with Fast's Couplings, Industrial Gas Cleaning Apparatus, Aeromaster Fans, Gas Apparatus.
Engineered Products Sold with Service

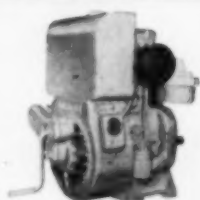


AMERICAN HAMMERED Industrial Piston Rings

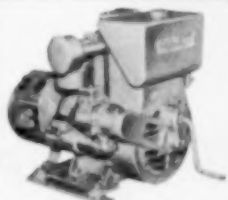


A NEW ALL-AMERICAN LINE-UP OF LOW-COST, LIGHTWEIGHT DIESEL ENGINES

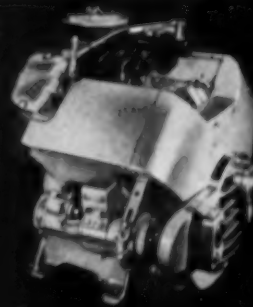
There's a new team now pulling together in the design and production of America's finest line-up of small Diesel engines. The financial strength and manufacturing experience of American M.A.R.C. is now firmly behind the line of Hallett Diesels—a guarantee that they represent greater values than ever before.



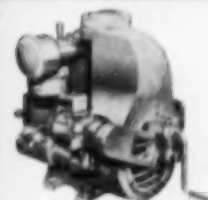
Model WC-1, one-cylinder, water-cooled, 4-cycle, 6 HP @ 1800 RPM. Wt.: 220 lbs.



Model AIQ-3KW, one-cylinder, air-cooled, 4-cycle, 3KW @ 1800 RPM, 6-7 HP



Model AC-2, two-cylinder, air-cooled, 4-cycle, 14 HP @ 1800 RPM. Weight: 350 lbs.



Model AC-1, one-cylinder, air-cooled, 4-cycle, 6 HP @ 1800 RPM. Weight: 220 lbs.

- ★ Air or Water Cooled; 5.5 to 25 hp
- ★ All-American, from basic materials to completed engines
- ★ Available as portable power units, generating plants, pumping units, or for marine propulsion

Mass production of American M. A. R. C. Diesels will be accelerated greatly in a new and larger plant that is now under construction. The latest in automatic processing machinery and streamlined production lines will speed the delivery of present models. Already the leader in the low power, lightweight Diesel engine field, new models to come will further strengthen this position. Some desirable sales territories are open; dealer inquiries are invited.

If you need a reliable, lightweight, full-Diesel for industrial or marine applications—or as a prime mover of powered equipment—write for literature. You'll be surprised and pleased at American M. A. R. C.'s small size, low cost, and modern "All-American" Diesel engines.

*American
Manufacturing and
Research
Company



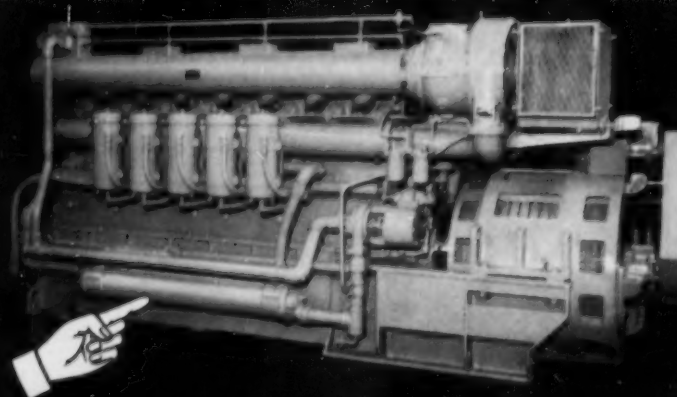
AMERICAN M.A.R.C.* INC. DIESEL ENGINES

1601 West Florence Ave., Box 549, Inglewood, Calif. • Telephone ORegon 8-7174

6-100



ROSS EXCHANGERS on the move in Venezuela



cooling lube oil in two White trailer-mounted diesel generator sets

Venezuela is booming with an economy that demands mobile electric power — and sometimes in a hurry! Representing "the latest word in highly maneuverable, trouble-shooting power plants," two of these 500 KW White Mobile Diesel Generator Sets have been purchased to furnish replacement power in areas where power lines and systems are being re-routed and expanded.

To keep each 712 BHP Superior Diesel running at the most efficient operating temperature, White Diesel Engine Division selected a Ross Exchanger for lube oil cooling. Longer engine life and more reliable performance under changing conditions are thus assured.

Because of their ruggedness and high thermal efficiency, Ross Exchangers are widely used as standard equipment on engines, compressors and other machinery for cooling lube oil, jacket water, air and gas.

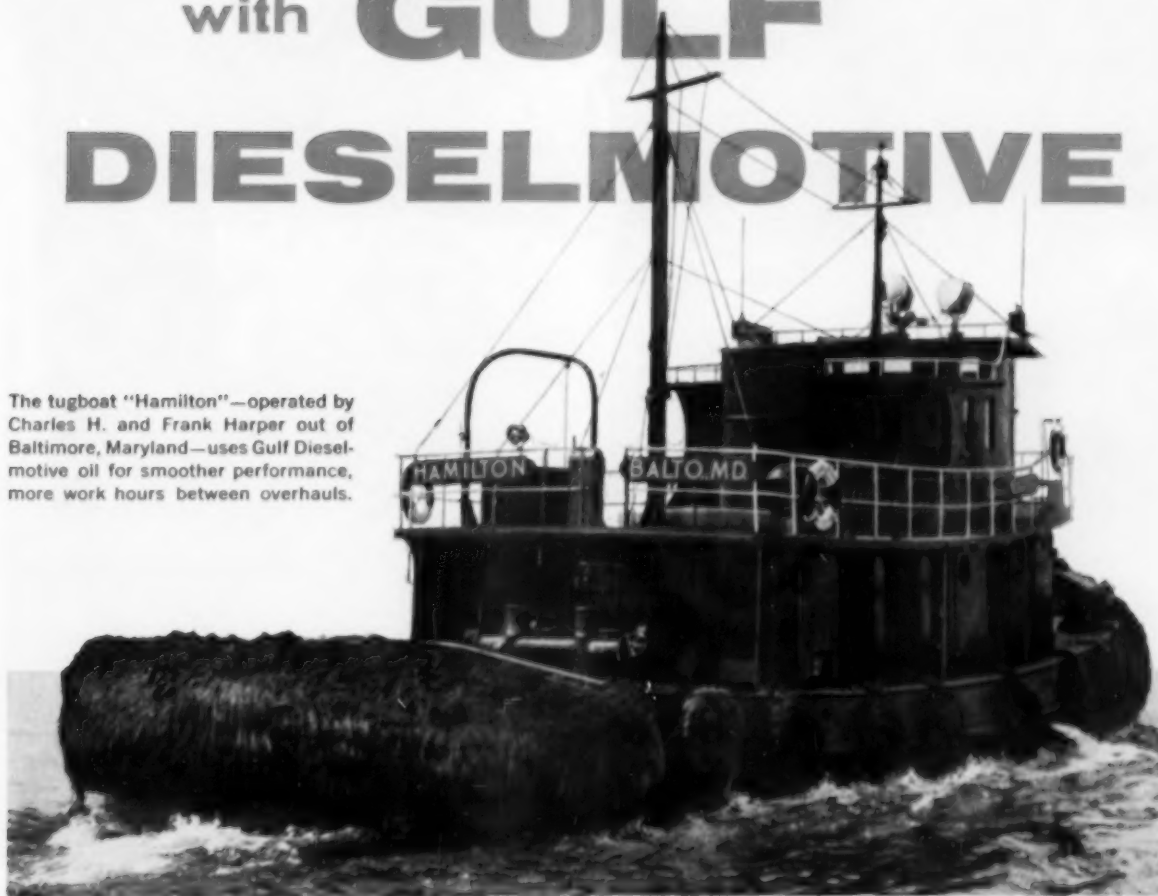
Why not learn more about these compact, pre-engineered units? They are fully standardized and available in a wide range of sizes to meet your needs. Write for Bulletin 1.1K5, Ross Heat Exchanger Division of American-Standard, Buffalo 5, N. Y. In Canada: American-Standard Products (Canada) Limited, Toronto 5, Ont.



Fewer ring jobs! Lower maintenance costs!

with **GULF** **DIESELMOTIVE**

The tugboat "Hamilton"—operated by Charles H. and Frank Harper out of Baltimore, Maryland—uses Gulf Dieselmotive oil for smoother performance, more work hours between overhauls.



Up and down the coast, on the inland waterways—diesel boats like the "Hamilton" are getting thousands of extra trouble-free hours with Gulf Dieselmotive. It can keep your engines running just as smoothly and cut your operating costs . . . because Gulf Dieselmotive gives extra protection at three important points.

PREVENTS HARD CARBON DEPOSITS ON PISTONS. Gulf Dieselmotive is outstanding in eliminating carbon build-up in hot spots. It also has a very high rust-preventive safety factor.

PROVIDES GREATER BEARING PROTECTION. 100% solvent refining of base stocks removes undesirable components, assures greater bearing protection . . . greater stability at extreme temperatures.

EFFECTIVE DETERGENT ACTION KEEPS RINGS CLEAN. Carefully matched additives insure clean rings, grooves, oil cooling passages and a minimum of piston crown deposits.

A Gulf Sales Engineer will be glad to recommend the proper grade of Gulf Dieselmotive for your requirements. Contact him at your nearest Gulf office or write to:

**GULF OIL CORPORATION
GULF REFINING COMPANY**

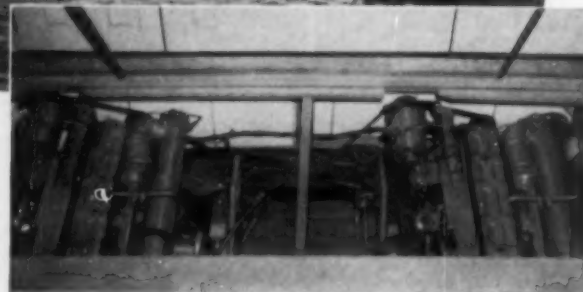
1822 Gulf Building
Pittsburgh 30, Pennsylvania



THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



Mr. Alfandre's Sport Fisherman "ROSIE" is a 32-ft Wheeler with a 10-ft, 9-in. beam and 2-ft, 6-in. draft. She is now powered by these Allis-Chalmers Model 273 Marine Diesels. They have six cylinders, 273-cu-in displacement, weigh only 1,000 lb, and outperform many marine gasoline engines of 115 to 150 hp.



"ROSIE" is S-m-o-o-o-t-h-e-r now ...and twice as thrifty

Since they gave her Allis-Chalmers Marine Diesels

Since Harry Alfandre, Long Island, New York, replaced her gasoline engines with two Allis-Chalmers Model 273 Marine Diesels, the change in "ROSIE" has been most gratifying. She is smooth, quiet and thrifty now... but here's the story in Mr. Alfandre's own words:

"These engines are exceptionally quiet, vibrationless and free from objectionable odors.

"Where I had previously burned 90 to 120 gallons of gasoline per day, I now burn 40 to 55 gallons of diesel fuel during a similar day's operation.

"Another big feature I like is that I can troll all day long with the engines operating at about 750 rpm and experience no choking up or other detrimental effects to the engine."

There are many other reasons to be pleased with the performance of Allis-Chalmers 273 engines — reasons that time will prove. Such things as 45,000-psi tensile crankcase, seven oversized main and rod bearings plus finger-tip control and positive temperature regulation — these features become more important to the owner with each additional year of low-cost operation.

Ask your Buda Division Marine distributor for all the details on this lightweight, economical Model 273.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

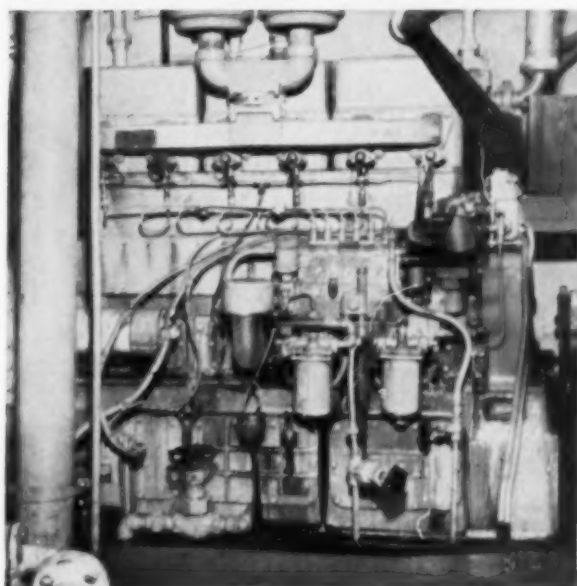
BM-2



The Engineer's Field Report

CASE HISTORY
RPM DeLo Marine
LUBRICANT *Lubricating Oil*
W.R. Chamberlain Co.,
FIRM *Portland, Oregon*

Marine generator shows no bearing wear after 6500 hours steady operation



THIS BUDA DIESEL AND THREE OTHER GENERATORS aboard the M/V C-Trader supply power 24 hours a day for all ship's lights. Each unit uses RPM DELO Marine Lubricating Oil—a specially developed lubricant for high-output, low-speed marine diesels. Chief Engineer, Bob Mader (above), took down this 40 kw. Buda after 6500 hours continuous constant-speed operation, found bearings and rings clear, free of lacquer deposits—no noticeable bearing wear.

FOR EXPERT HELP, Standard Marine Fuel and Lubricant Engineers in Seattle, Portland, San Francisco and Los Angeles will give ship operators expert help at any time.

FOR INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies below.

TRADEMARK "RPM DELO" REG. U. S. PAT. OFF.

W. R. CHAMBERLAIN CO. operates the C-Trader as a coastwise lumber vessel between Oregon and Los Angeles. Its main engine, a 1325 h.p. Cooper-Bessemer is also lubricated with RPM DELO Marine Oil—available in all principal ports.

Why RPM DELO Marine Lubricating Oil prevents wear

Special inhibitors fight deposits... solve residual fuel problems... help prevent scuffing



Contains anti-oxidant. Film stays on parts whether hot or cold; running or idle

Corrosion and foam inhibitors stop bearing corrosion, prevent foaming in wet or dry sump engines

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

SCHWITZER

TURBOCHARGERS



"ORBIT-SEEKING," "INSTANT-ACTION" WHEELS

These and other features exclusive in Schwitzer Turbochargers, account for proven installed performance and durability.

"Orbit Seeking" Wheels, as pioneered in Schwitzer Turbochargers, are now being featured in the Turbine Engine Industry.

"Instant Action" wheels assure rapid compressor acceleration for the best installed engine performance.

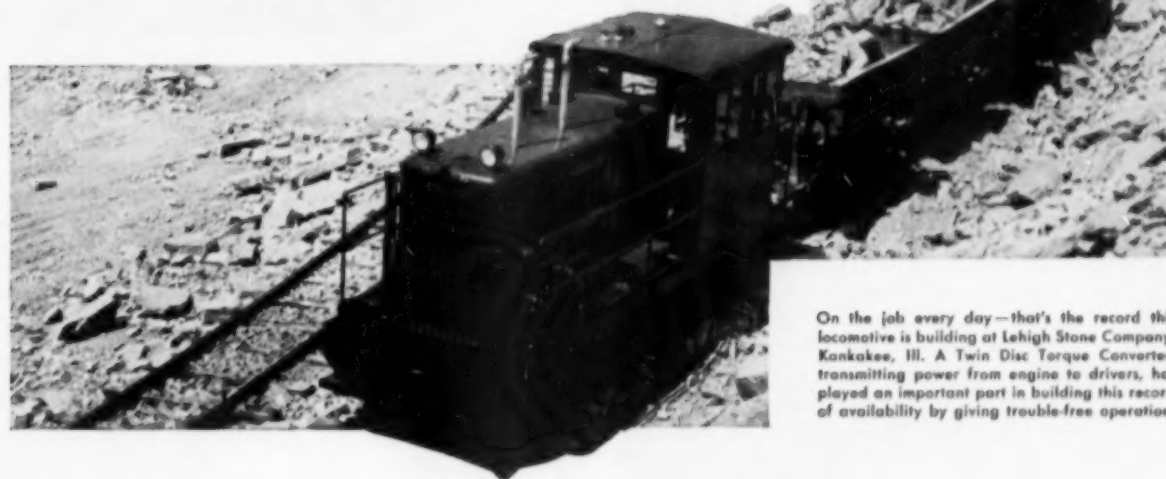
As your supplier, Schwitzer assures you of the most advanced design and economy in the field of fluid flow and vibration damping products.

SCHWITZER CORPORATION

INDIANAPOLIS, INDIANA



Twin Disc Torque Converters "operate to perfection" at Lehigh Stone Company



On the job every day—that's the record this locomotive is building at Lehigh Stone Company, Kankakee, Ill. A Twin Disc Torque Converter, transmitting power from engine to drivers, has played an important part in building this record of availability by giving trouble-free operation.

A re-built pit locomotive—powered by an International UD-24 Diesel Engine, driving through a Twin Disc Torque Converter—was the result of a modernization program, by Lehigh Stone Company, Kankakee, Ill., that ingeniously utilized components from worn-out steam-driven locomotives.

The original unit proved so successful that to date, four of these locomotives have been built. The result is a great saving in original cost over similar sized *new* locomotives, as well as a substantial reduction in operating cost, compared to steam.

International UD-1091's, which replaced the UD-24's in later models, have identical dimensions, but provide more power and higher speed, which make them even more adaptable for use with the Twin Disc

Three-Stage Torque Converters.

"The torque converters have operated to perfection, requiring no maintenance or repair other than changing oil and filter elements," states General Superintendent Delmor Groff. "In a recent haul test our tractive force was much better than expected."

Locomotive operators everywhere are finding similar results when Twin Disc Torque Converters are installed. Twin Disc Torque Converters permit smooth, fast acceleration... eliminate equipment-wearing shocks and stresses... provide maximum torque and tractive effort to the drivers—when needed most!

Specify a Twin Disc Torque Converter in your next locomotive or locomotive conversion. Take advantage of the many profit-making, cost-cutting features incorporated into

Twin Disc Torque Converter Drives.

For complete details, write Twin Disc Clutch Company, Hydraulic Division, Rockford, Ill. Request Bulletins 135-E and 508 (three-stage and single-stage torque converters).



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

They licked a problem— before it happened— with STANODIESEL Oil M

*How Sturgis light plant planned ahead to
eliminate source of possible power shut down*

Sturgis, Michigan, light plant management in 1946 determined that it might be difficult to satisfy all power requirements if the light plant's large engine, or more than one of its small engines, was down. The plant is equipped with 5 engines—four GM 1,600 H.P. and one Busch-Sulzer 2,475 H.P. Plant management rightly figured that one of the keys to the problem was good lubrication. So, in 1946, STANODIESEL Oil M was tested in one General Motors engine.

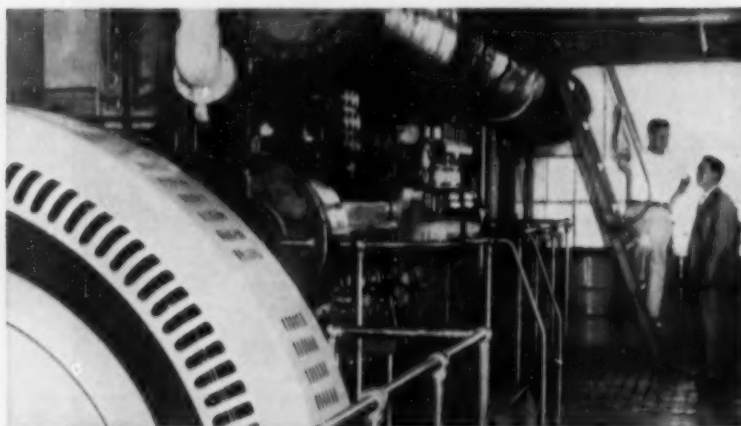
In 1947, based on its performance during the test, all engines were converted to STANODIESEL Oil M. In the nine years since, the plant has never had to shut down power to customers because of engine or oil failure. There have been no wear problems. Engines have stayed clean. There is no ring sticking. Bearing life is exceptional.

STANODIESEL Oil M can give this kind of performance for two big reasons: (1) its highest quality base stock, (2) its additive formula. STANODIESEL Oil M has superior stability. An oxidation inhibitor helps to prevent unwanted increases in oil viscosity. Detergent-dispersant additives keep crankcase, pistons, cylinder walls and other parts clean. An anti-foam agent controls foam.

There's a Standard Oil industrial lubrication specialist near you in any of the 15 Midwest or Rocky Mountain states. Call him for more information about STANODIESEL Oil M. Or write Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Illinois.



J. J. Threlfall, superintendent and Donald Cripps, Standard Oil lubrication specialist check Don's data book on Sturgis light plant diesels. Don is well qualified as a lubrication specialist. He has been doing this work for nine years. He has an engineering degree from Michigan State University and is a graduate of the Standard Oil Sales Engineering School.



Sturgis, Michigan, light plant has four GM 1,600 H.P. engines and this Busch-Sulzer 2,475 H.P. engine. Engines receive progressive maintenance at 3,500 to 4,000 hours. STANODIESEL Oil M is used in all engines.

Quick facts about STANODIESEL Oil M

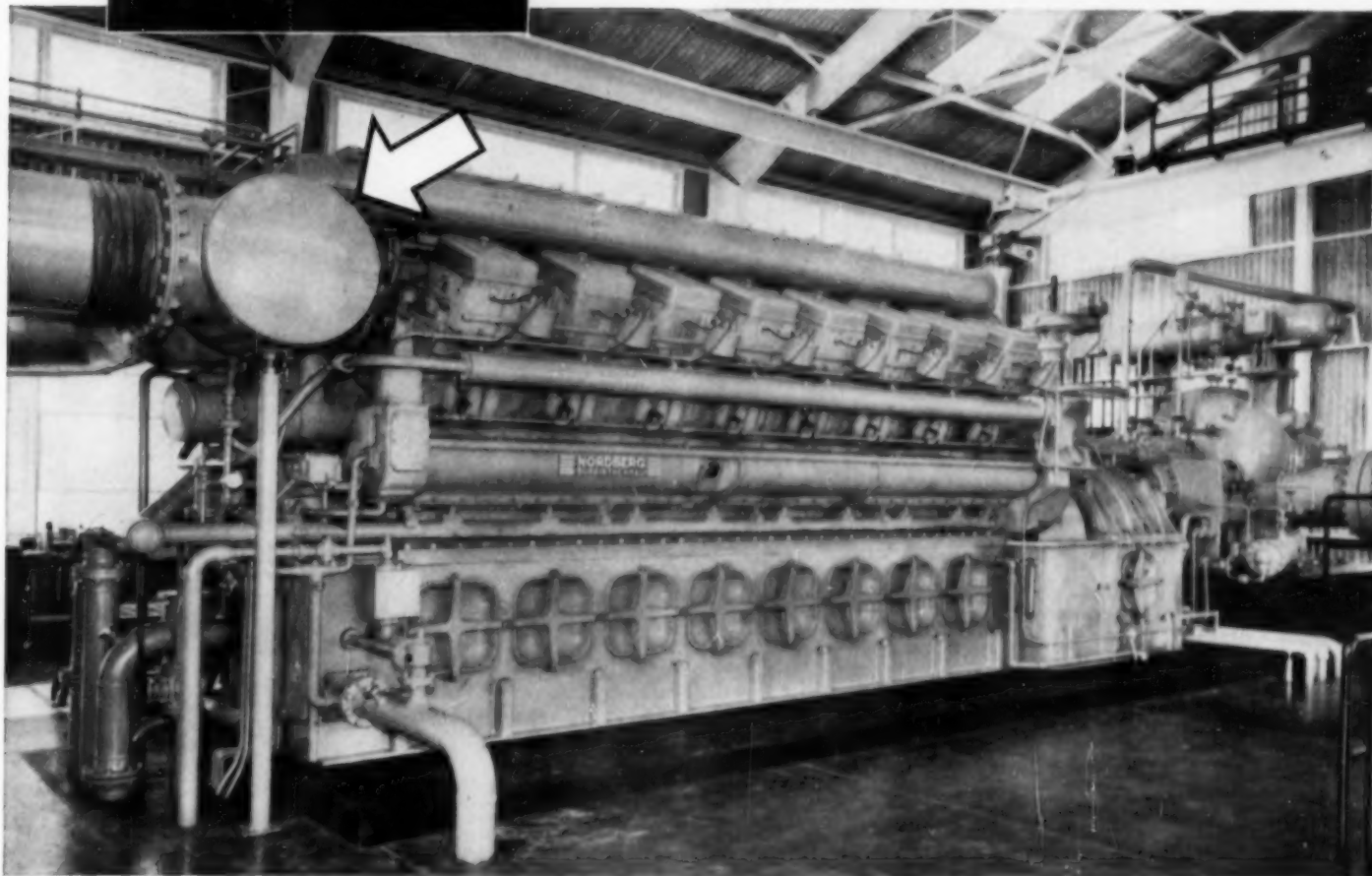
- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult to lubricate areas and parts.
- Eliminates spark plug fouling in spark ignited engines and reduces combustion chamber ash deposits in engines burning natural gas, LPG and liquid fuels.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil commingle.

STANDARD OIL COMPANY
(Indiana)



DE LAVAL
HIGH PRESSURE
TURBOCHARGERS

*double diesel output without
increasing thermal loading*



A Nordberg Supairthermal 3550 hp, 16-cylinder gas engine is turbocharged by a De Laval B-13 high pressure unit. This gas engine-gear set is driving a De Laval centrifugal gas pipeline compressor.

De Laval
High Pressure

Turbochargers utilizing a radically new design principle, can double the output of heavy-duty diesel, gas and dual-fuel engines *without increasing thermal loading*. • As a result of the exclusive Monorotor construction, De Laval turbochargers offer pressure ratios of 3:1 as well as far higher compressor and turbine efficiencies than those found in conventional turbocharger systems. De Laval units are self-adjusting to engine loads, can be used on 4- and 2-cycle engines. Other Monorotor advantages are exceptional simplicity and light weight.



Write for DeLaval Bulletin
8000 giving comprehensive curves
and flow range diagrams.



DE LAVAL Turbochargers

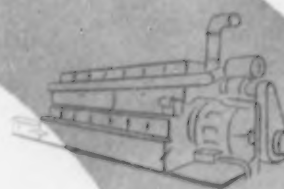
DE LAVAL STEAM TURBINE COMPANY

883 Nottingham Way, Trenton 2, New Jersey

DL 205

WOODWARD GOVERNORS

**For Diesel Engines,
Gas Engines
and
Steam Turbines**



The Woodward UG8 and UG32 Governors have been adopted by most engine manufacturers as their governing standard for electric generating, pumping and industrial service.

These models have proven themselves to be highly responsive, easy to adjust and capable of providing long, trouble-free service.

Dial models have a synchronizer or speed adjusting control to change the engine speed when running alone or change the engine load when the engine has been paralleled with other units. They are furnished with speed droop and load limit controls.

A synchronizing motor may be mounted on a special cover to provide remote speed control. It enables the operator, at the switchboard, to match the frequency of an engine driven alternator with that of other units, or a system, before synchronizing and to change load distribution after synchronizing.

Lever type speed adjustment models for use on variable speed applications are available in either size.

The UG8 and UG32 Governors are similar in appearance and construction. They differ mainly in available work capacity and physical size.



UG8
GOVERNOR

WRITE FOR DETAILS ON OUR UNIT EXCHANGE PLAN

Give serial number of typical governor when requesting any information.



WOODWARD GOVERNOR COMPANY
ROCKFORD, ILLINOIS

WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY



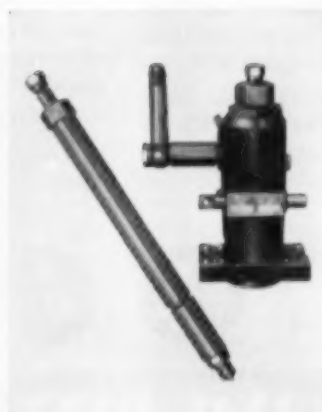
ON SHORTLINE AS WELL AS MAINLINE ROADS IT'S BENDIX FUEL INJECTION

All over the country shortline railroads like those listed here are giving 'round-the-clock service that helps make the American railroad system the envy of the world.

Using 70-ton and 95-ton General Electric road switchers powered by Cooper-Bessemer engines with Bendix® Fuel Injection Equipment, these shortline roads maintain high operating standards in the performance of their important work.

Bendix is proud that its fuel injection equipment has received such high endorsement from so many shortline railroad operators.

It furnishes further evidence that when dependable, efficient, and economical operation is a must Bendix is the logical choice for fuel injection equipment. SCINTILLA DIVISION OF BENDIX AVIATION CORP., SIDNEY, N.Y. EXPORT SALES AND SERVICE: BENDIX INTERNATIONAL DIVISION, 205 EAST 42ND ST., NEW YORK, N.Y. * REG. U.S. PAT. OFF.



This Bendix pump and nozzle are used on the type of road switcher pictured above.

Partial list of shortline roads using Bendix Fuel Injection Equipment

ALBANY & NORTHERN
ARKANSAS & OZARKS
BALTIMORE & ANNAPOLIS
BARRE & CHELSEA
BELFAST & MOOSEHEAD LAKE
COLORADO & WYOMING
DES MOINES & CENTRAL IOWA
EAST ERIE COMMERCIAL
FT. DODGE, DES MOINES & SOUTHERN
FRANKFORT & CINCINNATI
GEORGIA NORTHERN
GREENVILLE & NORTHERN
HAMPTON & BRANCHVILLE
LANCASTER & CHESTER
LIVE OAK, PERRY & GULF
MISSISSIPPI EXPORT
MOBILE & GULF
MUNCIE & WESTERN
NORTHAMPTON & BATH
RAHWAY VALLEY
SANFORD & EASTERN
SOUTH GEORGIA
TALLULAH FALLS
VALDOSTA SOUTHERN
WASHINGTON & OLD DOMINION

Scintilla Division





To the Employee Relations Director of every American company

LET'S FACE IT . . . the threat of war and the atom bomb has become a real part of our life—and will be with us for years. Fires, tornadoes and other disasters, too, may strike without warning.

The very lives of your employees are at stake. Yours is a grave responsibility. Consider what may happen.

When the emergency comes, everybody's going to need help at the same time. It may be hours before outside aid reaches you. The best chance of survival for your workers—and the fastest way to get back into production—is to know what to do and be ready to do it. To be unprepared is to gamble with human lives. Disaster may happen TOMORROW. Insist that these simple precautions are taken TODAY:

☐ **Call your local** Civil Defense Director. He'll help you set up a plan for your offices and plant—a plan that's safer, because it's entirely integrated

with community Civil Defense action.

☐ **Check contents** and locations of first-aid kits. Be sure they're adequate and up to date. Here again, your CD Director can help—with advice on supplies needed for injuries due to blast, radiation, etc.

☐ **Encourage personnel** to attend Red Cross First Aid Training Courses.

☐ **Encourage your staff** and your community to have their homes prepared. Run ads in your plant paper, in local newspapers, over TV and radio, on bulletin boards. Your CD Director can show you ads that you can sponsor locally. Set the standard of preparedness in your plant city. There's no better way of building prestige and good employee relations—and no greater way of helping America.

Act now . . . check off these four simple points . . . before it's too late.



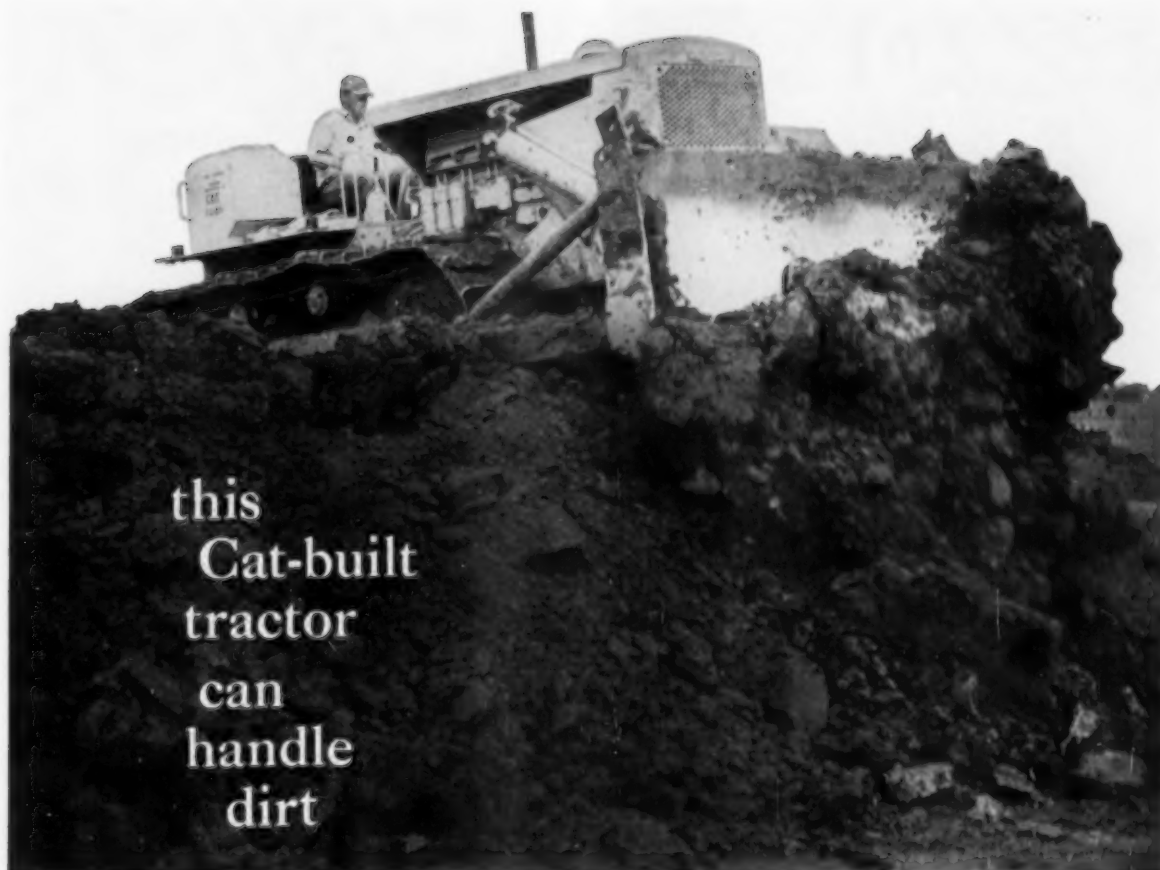
SPACE FOR THIS

CIVIL DEFENSE

MESSAGE CONTRIBUTED BY

Rx Dr. J. J. Adams





...with Caterpillar filter refills



Your Caterpillar dealer well knows the damage that dirt-laden oil can do to your tractor. Precision parts can be ruined in a matter of hours if unfiltered oil gets into the engine. That's why he always insists on giving you Caterpillar replacement filters. Built to meet the specific requirements of your engine by Purolator, they can handle all the volume your Cat-built tractor requires... they never let oil "by-pass" the filter... never let harmful abrasives enter the engine.

It's common sense to do as your Caterpillar dealer does... insist on Caterpillar filter refills. The life of your engine is at stake.

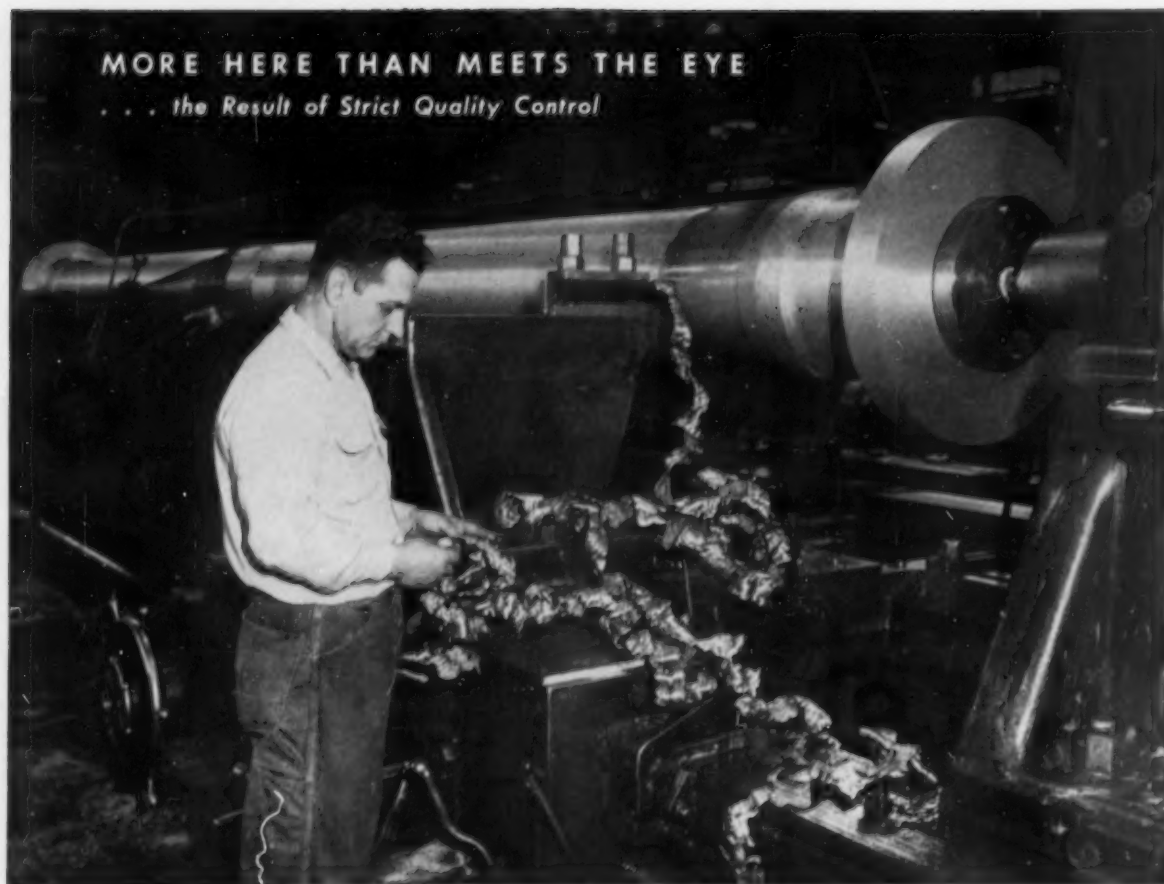
Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

Rahway, New Jersey and Toronto, Ontario, Canada

MORE HERE THAN MEETS THE EYE
... the Result of Strict Quality Control



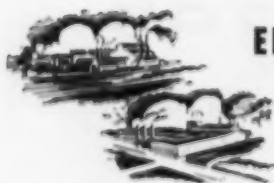
**37 Feet of Unbroken Steel Chip Thin as a Cigarette Paper*

A 37 foot unbroken chip as thin as a cigarette paper, coming off the tool, dramatizes the quality of the steel in this large ship's shaft.

Behind this proof of quality steel is the ever expanding program at Erie Forge & Steel Corporation to develop improved techniques in steel-making . . . strict quality control at every step of the way from the composition of the steel to the finished product. Control of phosphorus and sulphur, maximum elimination of hydrogen, improved concepts in

testing and evaluating quality are but a few of the areas under continuous research and development.

At Erie Forge & Steel, the belief that "excellent is not good enough" is sound assurance that you can place your steel forging and casting requirements here with full confidence. Your advantage is obvious . . . your steel forgings and castings are followed from start to finish under "One Responsibility and One Control".



ERIE FORGE & STEEL CORPORATION
ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE



QUESTION: *What railway-type, small diesel engine should car builders buy to power mechanical reefers?*

ANSWER: *Witte's ALL-NEW diesel engine-generator unit with two horizontally-opposed cylinders for railway mechanical refrigeration service — Model 100RDA.*

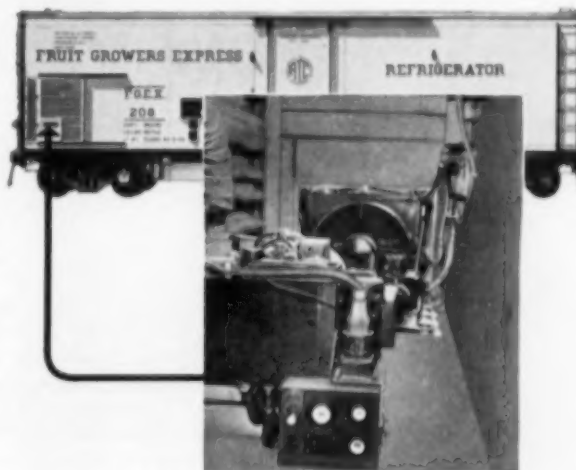
Witte's new streamlined, water-cooled Model 100RDA Diesel Engine-Generator Unit, with its two horizontally-opposed cylinders, is an accepted design for railway mechanical refrigeration.

Especially designed for severe service, the Witte 100 has a continuous rating of 18 hp (12 KW) — plus plenty of reserve power (24 hp maximum). This is adequate for cooling or heating cars up to 50' long where temperatures from -10° to 70°F have to be maintained. It is *sized-for-the-job* to give lower fuel consumption and lower maintenance cost than larger, more expensive engines.

With its horizontally-opposed cylinders, the Series 100 engine has a low center of gravity and is well-balanced and smooth running. Engine mass is concentrated on widely-spaced rubber mounting points giving positive anchorage in high-speed railway cars that are subjected to "humping" and operational shocks.



The simple design of the Witte engine makes maintenance easy. Fuel and oil filters and controls are also readily accessible. The photograph shows a check being made on a Witte Model 100RDA driving Carrier Corporation refrigeration equipment installed in a Pacific Fruit Express Company car.



Plenty of working space in this machinery compartment due to the low height of the Witte Series 100 (25 1/4"). The engine unit is in left foreground; instrument panel is in center foreground; condensing unit is at rear center; and DRC panel is on the bulkhead wall. This installation was made in a Fruit Growers Express Company car.

The Witte Series 100 operates on regular locomotive diesel fuel, and its simple fuel system is accurately governed to give close generator regulation. The package-type injection pump (comprising governor, fuel-transfer pump and shut-down solenoid) is mounted on top of the engine. An advanced precombustion chamber design gives quick and reliable starting in hot or cold climates.

Witte . . . noted for long-lived, continuous-running engines . . . has road-tested and service-proved this railway unit in reefer applications — where only a "live" engine is an acceptable one.

WRITE FOR MORE INFORMATION ABOUT THIS NEW WITTE . . . fill in and mail today.

WITTE ENGINE WORKS

OIL WELL SUPPLY DIVISION UNITED STATES STEEL CORPORATION
1606 Oakland Avenue • Kansas City, Missouri

WITTE ENGINE WORKS
OIL WELL SUPPLY DIVISION UNITED STATES STEEL CORPORATION
1606 Oakland Avenue, Kansas City, Missouri

Gentlemen:

Tell me more about the Witte 100 Engine.

Name Title

Company

Address

UNITED STATES STEEL



In place of wasteful and uncertain crankcase-oil changing based upon hours in service, many operators now use a better guide that saves them both time and money.

Now you can test used oil in minutes

IT HAS COME as something of a surprise to some maintenance men to discover that they have been throwing away hundreds of gallons of still-good oil . . . year after year. Conversely, it is quite a jolt to realize that a costly engine-repair job could have been prevented by an on-the-spot analysis that would have shown up the condition . . . in minutes!

The recommendations for oil changes issued by engine makers have always been computed on "averages" for the various classes of vehicle service. And like the "average" man on the insurance chart, the average vehicle doesn't exist in the actual fleet. Two engines of the same make and model, operating on the same job, can have quite different patterns of oil economy and engine condition. Obviously no one set of rules can apply ideally to all diesels. And fortunately there is no longer any need for such generalization.

From a couple of drops of used oil, the Shell "ADC* Oilprint Analysis" provides a reliable check of oil condition, in minutes. It is very simple, and with a

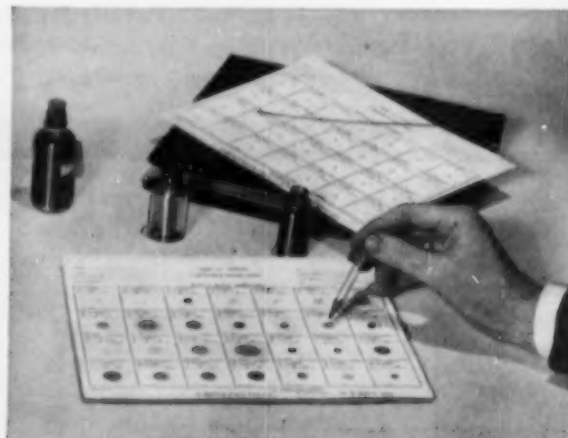
little practice, it tells you a lot about that oil and the engine that uses it.

What a drop of used oil shows: You place a drop of used oil on a piece of special filter paper supplied by Shell . . . let it stand a minute or two. You will then be able to see the following:

Water dilution: Even a tiny amount of water shows up . . . and that means not only that your oil is losing its ability to protect engine parts, but it also shows whether the water represents a normal amount of condensation or something more serious, such as an actual leakage of coolant from a faulty jacket.

Dispersancy/detergency: The same oil drop will give you a picture of how well the special additives in the oil are doing their job . . . whether or not the contaminants are being held in suspension where they do least harm . . . whether the cleansing and dispersing actions are adequate . . . whether the oil is still good.

Adulteration: The color of the oil spot will show whether too much contamination is occurring . . . and



The simple test setup: sample bottles, a wire rod, a bottle of "indicator," and the permanent record card.



This single, on-the-spot sample reveals many things about an engine.



A fleet superintendent sees how easily the test is made.

will very often point up the cause, indicating a check on injectors, nozzles, oil and air filters.

All of the above can be learned from the single drop of oil . . . in an amazingly short time.

Alkalinity: Engine wear and engine deposits increase as the oil becomes acidic in nature due to contamination from combustion products. A special indicating fluid, developed in Shell Laboratories, tells at a glance whether oil is alkaline and still usable, or acid and how much.

Operators who keep an ADC Oilprint Analysis record of each vehicle generally find that the crankcase oil stands up longer than they had figured . . . a distinct saving in lubrication cost. At the same time, there is a running check on each engine that often detects impending trouble before its correction becomes costly. In this respect, the Shell ADC Oilprint Analysis qualifies definitely as one of the valuable recent tools of preventive maintenance.

If you are concerned with extending the service of crankcase oil, and with avoiding the risk of using oils loaded with contaminants, we suggest that you have one of the Shell service engineers demonstrate ADC Oilprint Analysis for you.

*Trademark



Photo shows an oil-spot test card...one phase in the visual life record of a charge of oil.

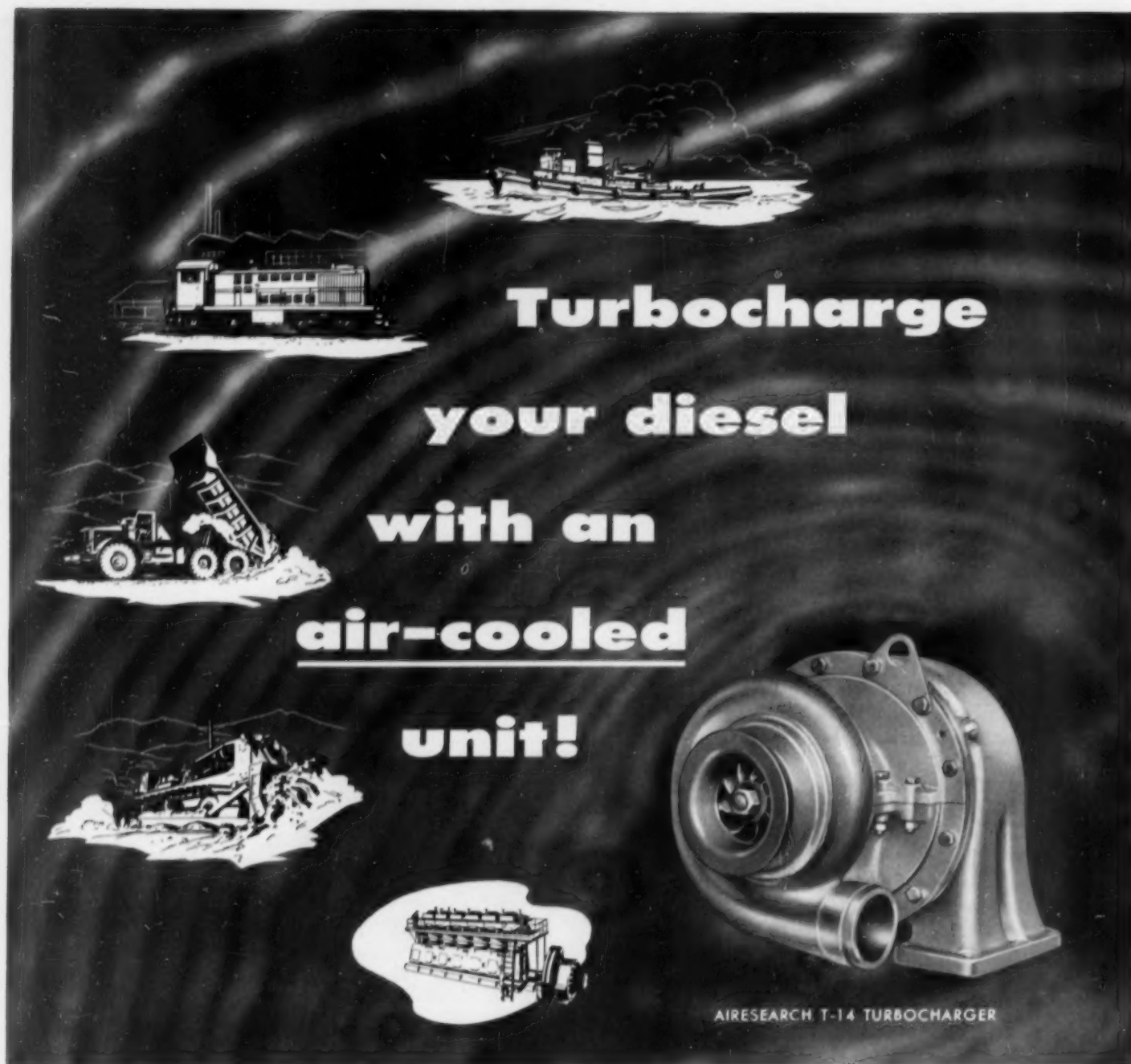
The Shell "indicator" shows acidity instantly. If spot turns red, oil is no longer fit to use, should be changed quickly.



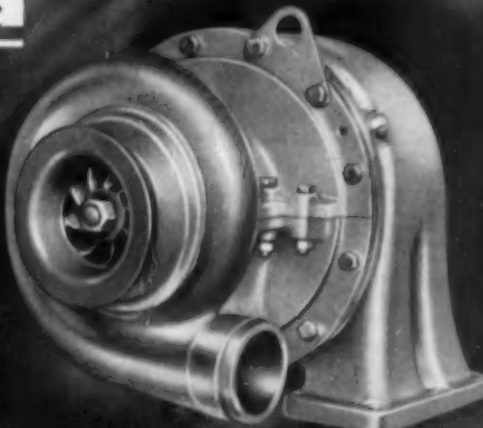
SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA





Turbocharge your diesel with an air-cooled unit!



AIRESEARCH T-14 TURBOCHARGER

AiResearch turbochargers increase power to the full capacity of the engine, yet require no extra plumbing and put no added burden on the cooling system.

The diesel industry generally has recognized the fuel-saving, noise and smoke reducing and power-adding advantages of turbocharging. But there are important differences between turbochargers. Some are difficult to service and add complicated plumbing because of the necessity for water-cooling.

All AiResearch turbochargers, from the smallest units for mobile equipment to the large, stationary power plant models, are air-cooled. Each contains a removable rotating assembly which simplifies maintenance, especially in the

field. Their modern design resulted from the most extensive experience in the field of small turbomachinery in America.

We invite your inquiry on their application to your diesel equipment.

BASIC SPECIFICATIONS FOR AIRESEARCH TURBOCHARGERS

MODEL	T-10	T-14	T-15	T-30-2	T-30-6
Diameter — in. nom.	9	11.5	15.25	15.25	16
Length — in.	9	14.12	16.75	17.25	21.75
Weight — lb.	40	95	125	135	195
Output — lb/min. (Standard Conditions)	25-40	35-65	35-65	70-95	115-175

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

A FACE-LIFTING FOR M-24

By J. W. BROWN*

Diesel Equipment Plays Key Role in Converting 7½ Mile Stretch of Heavily Travelled Dangerous 2 Lane State Highway Into A New 4 Lane Divided Highway.

NOT at all unusual in these days of accelerated road construction, but a good example of how important diesel equipment is to such projects, is the rebuilding of Michigan's route M-24 from north of Pontiac to Lake Orion, Michigan. Here a 7½ mile stretch of very heavily travelled, hilly 2-lane state highway is being con-

*Detroit Editor DIESEL PROGRESS

verted with Federal aid to a new 4-lane divided highway. The job is being done by Lewis and Frisinger, Ann Arbor, Michigan contractors for the Michigan State Highway Department at a cost of over \$1,250,000.

Started in August 1955, the project is scheduled for completion by this December. There are about 120 men working on the job which involves 650,-

000 cu yds of excavation and fill. From the field office, we obtained the following list of diesel equipment being used:

4 Caterpillar D8 Tractors; 3 Allis Chalmers HD 20 Tractors; 1 Allis Chalmers HD 21 Tractor; 4 Bottom-dump Euclids; 1 End-dump Euclid; 3 Allis Chalmers Model 300 Scrapers; 3 Allis Chalmers Model 360 Scrapers; 1 LeTourneau-Westinghouse

"Murder In The Making". This shows M-24 as it was before the widening; combination of heavy truck traffic and 65 mph speed limit on 2-lane highway is the situation the State of Michigan is trying to remedy.

23





LeTourneau-Westinghouse 'Tournapull' with GM Detroit diesel engine delivering a load of sand fill just ahead of the paving machine.

Model D Roadster; 2 Caterpillar #12 Graders; 1 Austin-Western No. 99 Grader; 5 Northwest Shovels and 1 Worthington Paver.

Control of the operation is assured by 2-way Motorola radio telephone contacts between the centrally-located field office in an old farm house, the repair shop and several cars and trucks. It is

significant that changing this narrow highway, teeming with heavy gravel trucks and vacation traffic to a 4-lane, divided highway is being done with absolutely no interruption or detouring of traffic other than from one side of the right-of-way to the other.

Two considerable (for this area) obstacles to the

Two of these Allis Chalmers model 360 scrapers (with A-C Buda engines) push-loaded by an Allis Chalmers HD-20 tractor (GM 6-110 engine) worked as an excavating unit, cutting away one section of road bed and filling another. Six A-C scrapers and 3 A-C tractors were employed on the project.



new road were present in the form of a sharp hill and a nearby bog. The hill required a maximum excavation of 24.45 ft plus an additional 5 ft refilled to provide a sound base for the concrete. This excavation extended over about 500 yds and was flanked on one side of the hill with a 160 yd long fill. The second obstacle, not far south of the hill was a bog which called for excavation to 24 ft below the road level and refilling with stable material.

The diesel equipment outlined in this story and shown in the accompanying pictures was kept in good repair by means of a well-equipped service shop and a special lubrication truck outfitted with hose reels containing track roller lube, general use grease, diesel engine lube oil and air. This contractor-designed truck with its pressurized lubrication hoses makes lubrication of the varied machines fast and easy and keeps down time to a minimum.

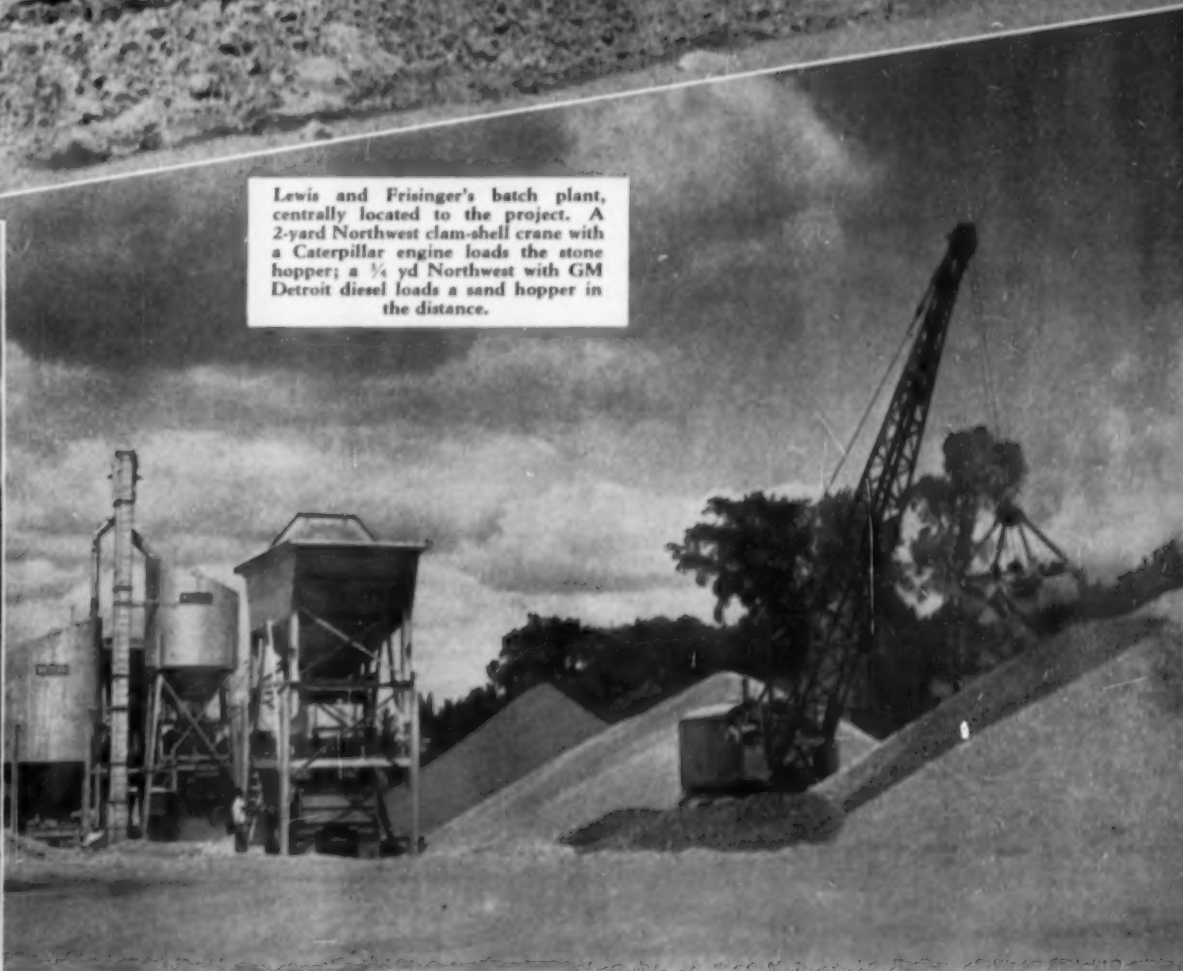
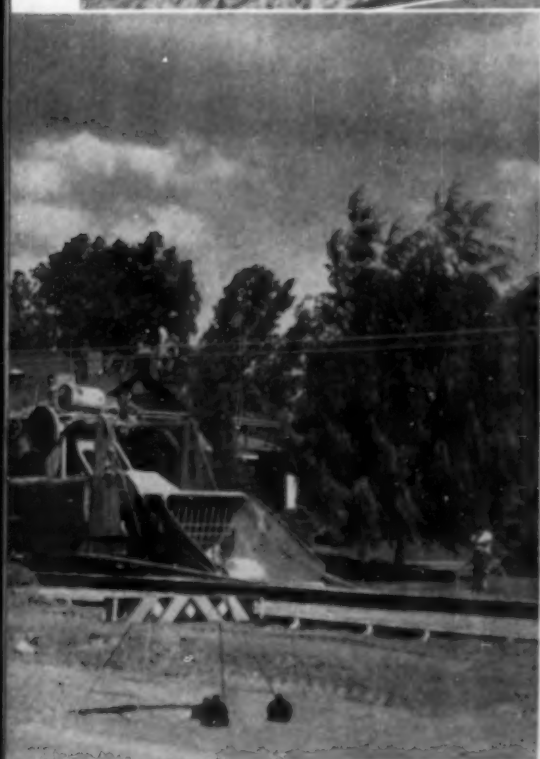
This Austin-Western model 99 grader with plenty of power delivered by her GM Detroit diesel found many uses on the project, including fine grading ahead of the paving machine, as shown here. Large motor graders like this one rely heavily on the flexibility and dependability of their diesel prime movers in performing many and varied key functions in road-building projects like this M-24 job.

Working right alongside the heavily travelled highway, this Worthington paver, with power provided by a Cummins diesel engine, spreads up to 160 ft per hr of 10 in. paving 22 ft wide. It is interesting to note and a credit to the contractor that the highway work is being done completely with absolutely no interruption of traffic or detouring other than from one side of the right-of-way to the other.





Lewis and Frisinger's batch plant, centrally located to the project. A 2-yard Northwest clam-shell crane with a Caterpillar engine loads the stone hopper; a $\frac{1}{4}$ yd Northwest with GM Detroit diesel loads a sand hopper in the distance.



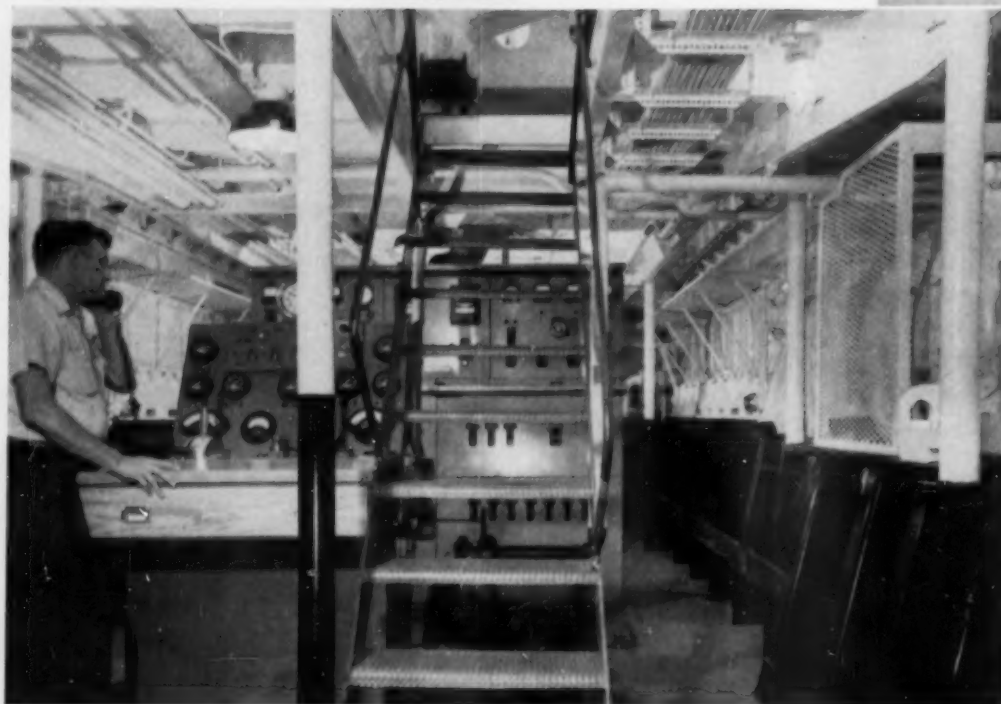
RAYMOND E. SALVATI

By A. D. BURROUGHS

THE fifth and largest diesel towboat addition to the Island Creek Fuel and Transportation Company (Huntington, West Virginia) fleet is the new Enterprise-powered, Dravo-built towboat, the *Raymond E. Salvati*. Now in action in the heavy coal trade, the design and performance theme featured from top to bottom for this new craft could easily be marked practical for a purpose. It is the clean-cut, modernistic practical design of this 148 ft x 54.7 ft x 10 ft 6 in. vessel which first attracts the river eye. While incorporating all features for luxurious comfort, safety, and dependable work performance, this towboat is literally stripped of any superfluous articles or design frills. It is this clean-cut smooth design, planned basically for increased barge push power that results in the beauty from simplicity for this new fleet addition.

This practical smooth-line design for the purpose of beauty and economical push power remains very predominate from top to bottom of this towboat. The spacious pilothouse providing ample river view for safe piloting is located on the forward end of the upper deckhouse. It eliminates every item not essential, yet includes every modern aid for safe, profitable piloting including the ship-to-shore telephone, river radar, complete set of searchlights, floodlights, and the Dravo-designed hydraulic steering gear controls. The upper deckhouse, with ultra-sleek modern staterooms for officers, along with the officers' modernistic lounge, which can be converted into private guest quarters, also highlights the practical-for-a-purpose theme. The metal-paneled interior walls, combined with absence of any frills, provides true beauty as well as maintenance advantages resulting from the simplicity of design. The main deckhouse includes the modern galley, equipped with the latest in modern appliances, as well as the messroom, the neat, comfortable crew quarters and the attractive sleek-design crew lounge.

This practical-for-a-purpose emphasis, seen throughout this towboat receives special interest and attention in the machinery space and the steering gear compartment, also located in the 34 ft wide main deckhouse. These quarters here, the real business end of this towboat, as well as the modern, practical hull design, are the results of Dravo's modern basin testing program underway in this country and overseas, planned to include the various developments designed specifically for the purpose of increasing this new vessel's barge push power. Here are found the two Enterprise diesel marine engines developing the rated 2,550 hp and driving through Falk reverse and reduction gears. More thrust is added for the end purpose of more push power by controlling the water flow to and away from the propellers with the special Dravo



In circle above, Mrs. Raymond E. Salvati breaks the traditional bottle of champagne officially christening the new towboat named to honor her husband in the ceremonies conducted at Pittsburgh's Point, where Monongahela and Allegheny Rivers meet to form the Ohio.

The machinery space and steering gear compartment, housing the twin Enterprise Model DMG-38 engines is located in the 34 ft wide main deckhouse, results of Dravo's extensive model basin testing program.

Kort Nozzle design with inside rotation of the two four-bladed 8 ft 6 in. diameter propellers. The six rudders, one behind and two ahead of each propeller are operated hydraulically, controlled by the steering levers in the pilothouse and are all more segments of the practical design for the purpose of more push power for less operating money.

Named in honor of the president of the Island Creek Coal Company, parent firm of the inland river transportation company, official christening ceremonies were conducted at the Allegheny Wharf at Pittsburgh's Point, where the Monongahela and Allegheny Rivers meet to form the Ohio River. Mrs. Raymond E. Salvati, breaking the traditional bottle of champagne, served as sponsor to officially christen the towboat named to honor her husband. Mrs. Eloise Barkell Hamilton served as aid.

The *Salvati* is the second towboat built by the Dravo Corporation for Island Creek Coal Company and its affiliated firms. The dravo-built 108-ft *James D. Francis*, with Superior engines totalling 1066 hp joined the Island Creek fleet in 1951. The 1953 addition, *Island Creek*, was built by Sturgeon Bay Shipbuilding & Dry Dock Company, measuring 108 ft, equipped with GM 567 engines for the 1800 hp. The 800 hp *Porpoise*, last year's fleet addition, and the five-year-old *Black Onyx*, the Class-3 Sea Mule with 330 hp completes the fleet for this Huntington, West Virginia firm. Following the christening, the *Salvati* was heralded all along the inland rivers for its modern functional design, with open-house inspection held at Cincinnati. From there, the *Salvati* entered into work operation, with its practical design for the purpose of economical performance from more barge push

power, becoming the fifth diesel towboat for this fast-growing inland river fleet owned by Island Creek Fuel and Transportation Company.

List of Equipment

Main Engines—Two Model DMG-38 Enterprise Diesels

Reverse-Reduction Gears—Falk

Air Compressors—Gardner-Denver

Strut Bearings—Cutless Rubber

Generator Units—General Motors, Detroit Diesel

Lube Oil Strainers—Cuno

Lube Oil Filters—Honan-Crane

Water Filters—Cuno

The smooth, clean-cut modernistic lines designed for a practical purpose mark the new Enterprise-powered, Dravo-built *Raymond E. Salvati*, the largest and fifth diesel towboat addition to the fast-growing Island Creek Fuel and Transportation Company fleet.



WHITE INTRODUCES MODEL 3000 TURBODIESEL TRUCK

By DWIGHT P. ROBISON

FULL production has been started by The White Motor Company on its new cab-forward highway tractor—the White 3000 Turbodiesel, according to P. E. Tobin, vice-president, sales. With the introduction of the 3000 Turbodiesel, White rounds out its full complement of highway tractors engineered for maximum payload advantages under any pattern of state highway weight and length laws and any mileage and schedule demands of the individual operator.

The White 3000 series with the power-lift cab provides maximum payloads where heavy front axle loadings are important payload factors. The White WC conventional tractors continue the lightweight series for applications where weight-savings alone help boost operator earning power. The White 9000 tractors with the 90 in. dimension (front of bumper to back of cab) provide maximum advantage where axle loading and spacing are desirable for bridge formula states. All of these tractor series are provided with either the new White 400-Series Mustang gasoline engines or turbocharged or natural aspirated diesel engines. "The White 3000 opened a new period of payload design when it was introduced as a gasoline-powered highway tractor," Mr. Tobin said. "Many truck operators have standardized their fleet operations on this functionally designed tractor with the power-lift cab because of its unique weight distribution and payload advantage."

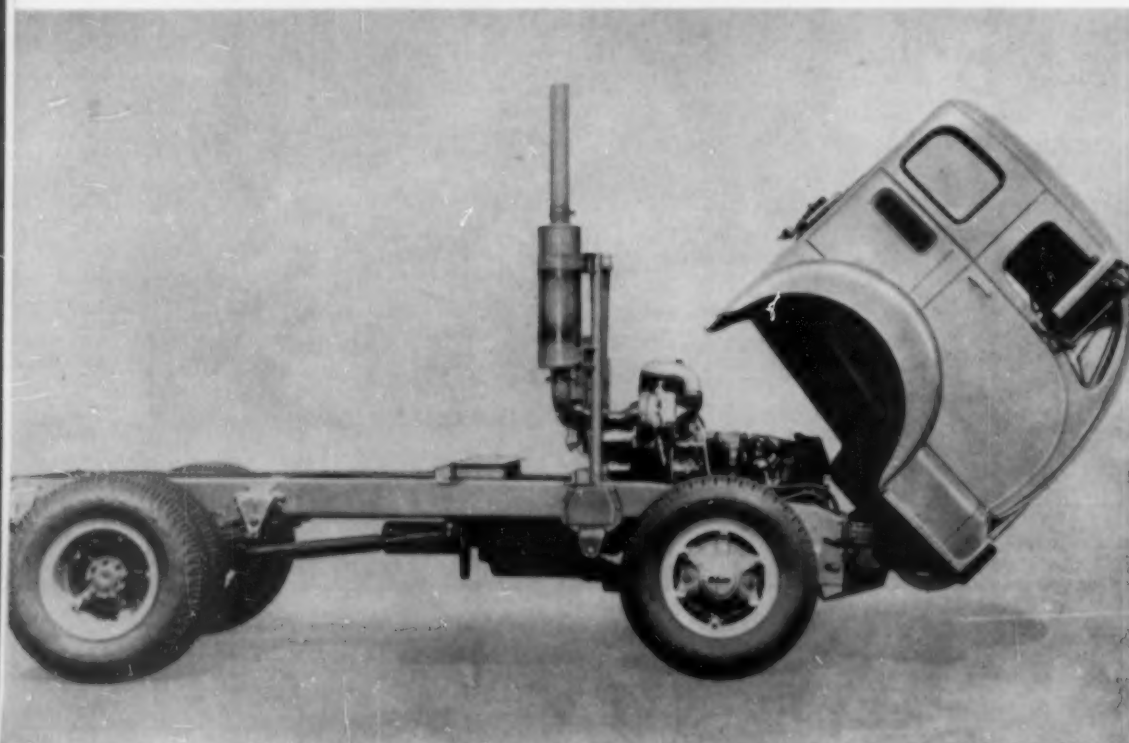
One of the country's leading highway motor freight firms, Spector Motor Freight System, of Chicago,

has put the first fleet of the diesel version of the White 3000 into service recently. They will go into service on the company's mainline Chicago-New York operations, further modernizing Spector Customized Service with important time-saving and schedule improvements, as well as instituting excellent payload advantages.

Continuing the White 3000 design in principle, the new Turbodiesel introduces a cab 4 in. higher than previous 3000 models and affording a more commanding position for the driver, with excellent safety and visibility on the highway. Longer, resilient front springs and direct, double acting shock absorbers, plus the good weight distribution, result in excellent riding comfort. There are no cab floor obstructions or doghouses—continuing the clean, modern cab appearance both inside and out. Other important driving advantages are also the wide track front axles, shorter wheelbase and short turning radius for outstanding maneuverability.

The 175 hp Cummins JT6B-15 Turbodiesel drives this new truck. The lightweight diesel with the PT fuel system provides low-weight extra-power and high efficiency. In commenting on this great power plant, Mr. Tobin said, "We have had many reports from highway operators operating our Model 9000TD's equipped with the Cummins Turbodiesel that are wonderful indications of its fuel economy and long life. We are satisfied that it will prove to be just as profitable and efficient in the 3000 tractors."

Here is one of the new White 3000 tractors powered with Cummins JT6B-15 Turbodiesel which has recently been put in service by Spector Motor Freight System of Chicago.





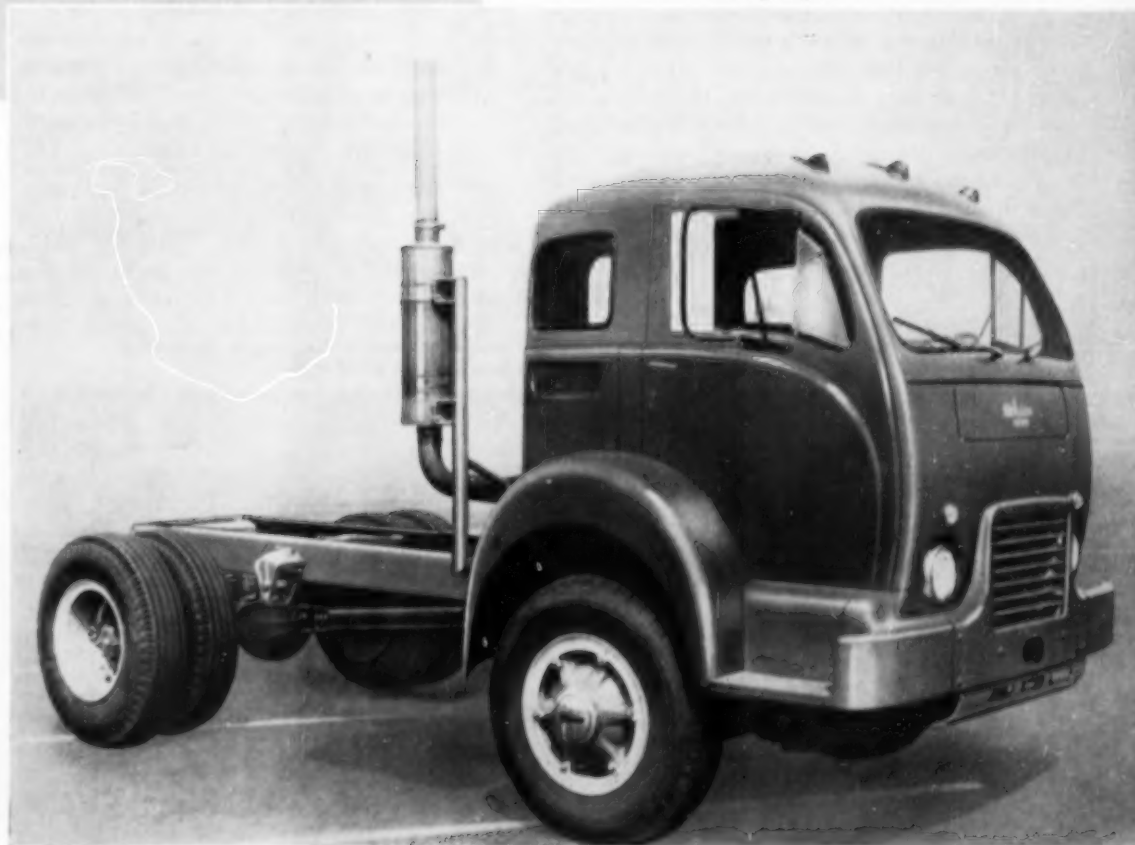
ture for the most efficient engine operation and for maximum horsepower.

The weight distribution of the 3000 diesel provides another reason for the excellent acceptance of this modern tractor. The unit ready for the road permits excellent load tolerance and additional payload weights. In addition, a full 35 ft trailer may be accommodated within 45 ft, or 40 ft trailer within 50 ft overall length even with a sleeper cab. The 3000 Turbodiesel is available under White's practical Unit Plan which tailors the tractor to specific operating conditions. For example, rugged, wider tread front axles may be selected for maximum loading up to 11,900 lbs and chassis units reflect the same extra-capacity and strength for various applications.

There is a wide selection of White rear axles and different gear ratios to further tailor to load and road conditions. Improved design and new materials increase strength and reduce weight. Housings, for example, of hot forged, high-carbon steel are 19% stronger than malleable iron housings. There is also a choice of wheelbases—103, 109, 119½ and 124 in. and other unit selections that

The White 3000 Turbodiesel tractor cab is 4 in. higher than previous 3000 models and affords a more commanding position for the driver to provide excellent safety and visibility on the highway.

Interior of the cab follows clean modern appearance of this new tractor with no floor obstructions or dog-houses.



Another advance has been made in the engine cooling system of this new White in the introduction of the Wind Tunnel design. This improved air flow along with the larger radiator and surge tank provides very efficient cooling. The efficient Snorkel-Air induction system incorporates the use of automatic thermostat controls, drawing warm air from under the cab, cool air from outside, or modulating for any mixture to the right tempera-

make this unit particularly advantageous under varying highway conditions. New White multi-functional chassis design with bolted construction adds to the life and ruggedness of this new tractor. The White 3000TD is available with regular power-lift cab as well as the 3000 sleeper cab and also with the White Steering Pusher axle for additional payload benefit under some operating conditions. Power steering is available as an option.

HUDSON, MASSACHUSETTS

**Hudson, Mass. Has Used Diesels Since 1928 For
Better Service, Lower Electric Rates And A
Smaller Tax Burden For The Town.**

By ARNOLD B. NEWELL

WHEN the wayfarer enters the town of Hudson, Mass. he reads a broad banner, stretched from side to side of the street stating that the electric rates are low, the service is excellent, the taxes are reasonable and the place is a good one to live in. The citizens of the town are informed that the municipally owned central power station with its diesel driven generators is not only responsible for the low rates for electricity, it reduces taxes by earning a profit which goes into Hudson exchequer.

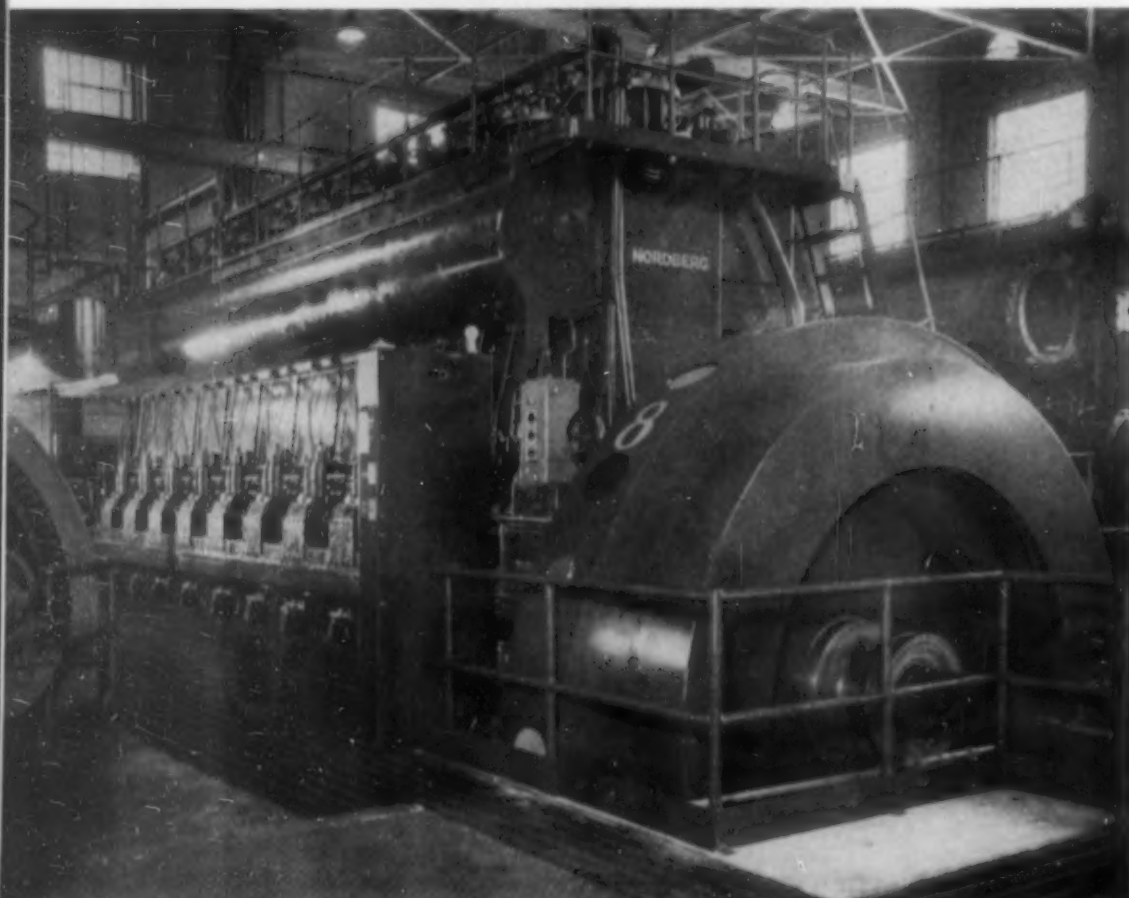
This has been going on for a long time and some of the diesels became old in the process while the power demands increased making necessary the installation of new engines of more power. Newest addition to the plant has recently been put on the line. It is a Nordberg two-cycle crosshead type rated 5100 bhp, driving a 4000 kw generator. The engine is a 10-cylinder unit with 21½" bore and 31" stroke operating at 240 rpm. This is the second Nordberg of the same type and size, but the rating is higher, the earlier installation being rated only 4250 bhp driving a 3000 kw generator. The installation of this engine was described at length on pages 35 - 37 of the March, 1955 issue of DIESEL.

PROGRESS. The plant manager, Mr. Thomas A. Walsh found the first Nordberg of great worth. In this connection he reported to the Hudson Commissioners of Public Works in these words, "We had very little trouble with the engines this year. The Nordberg continues to be the backbone of the plant. It ran 8500 hours, about 97% of the time possible. It generated nearly 66% of output."

At the start of the report quoted we find what Mr. Walsh refers to as "the essential points . . . in the following interesting facts"

Income	\$619,406.37
Expenses	543,567.67
Gross profit	\$ 75,838.70
Deductions for interest on notes	\$8,297.49
Miscellaneous adjustments	993.05
Payment on notes	25,000.00
Misc. deductions—Expense of bonds	777.97
	\$35,068.51
Net profit	\$40,000.00

The new 5100 hp Nordberg on the line and working so there is time to give the Busch-Sulzer in the background a long over-due going over.



That net profit figure is something to have in mind when Mr. John Q. Public looks at his low electric rate and also his lowered taxes. On this subject Mr. Walsh has said, "The chief reason we can sell our electricity cheaper than a private company is because of the extremely low maintenance costs of the diesels as opposed to steam turbines."

As a matter of fact it takes quite a bit of ingenuity to hold down the fuel bill. The new Nordberg is a dual fuel engine and it can cut in on the natural gas line if that happens to be the cheapest or the most available fuel—and availability is important. For example, heavy heating loads in winter now over tax the gas supply and none is available for power house fuel. The engines will burn residual fuels, but as a matter of fact automobile crankcase drainage is being used after processing in a manner similar to that of preparing residual for use as diesel fuel. The experiment seems to be working out well enough although there is an economic problem of importance associated with conditioning the used lubricating oil. The solids load up the ordinary centrifuge and for that reason one of the DeLaval Nozzle-Matic continuous heavy fuel centrifuges is used.

Hudson is a town with diesel operating experience dating back to 1928 and the era of air-injection engines. Municipal ownership dates back even further. In 1897 the company then furnishing electric power was providing inadequate service and the town took over the power plant. By 1928 Hudson was faced with repairing or rebuilding the old boilers or finding some better way to get power. They considered a new steam turbine system and buying power but decided on a diesel plant and by July of 1929 they cut loose from the utility entirely and went on their own diesel plant. This was made up of two 8-cylinder 900 hp McIntosh & Seymour 4-cycle, trunk piston, air injection engines and another of the same make and similar design with six cylinders rated 675 hp. It is an interesting fact that the removal of an old McIntosh & Seymour provided space to install a new 5100 hp Nordberg. When the diesel plant began operation the cost of generating power dropped from \$.02237 to \$.01079 and the average bill per citizen was the unbelievably low amount of \$1.40.

Over a period of years other engines were installed. One was a 6-cylinder McIntosh & Seymour 20x24 to drive an 835 kw generator. Another was an Alco Sulzer 2-cycle 8-T-36 mechanical injection unit driving a 1000 kw generator. Then a 3000 hp Busch-Sulzer 2-cycle 9-DHT-27 and a 2000 kw generator was installed in 1942 and finally in 1950 the first Nordberg was installed, which as previously stated is a 10-cylinder 2-cycle, crosshead type with mechanical injection, a dual fuel engine rated 4250 hp driving a 3000 kw generator. This is the one Mr. Walsh praised so highly in his report to the Commissioner of Public Works. Actually the 3000 hp Busch-Sulzer introduced the first of the Nordberg "family" for the famous old St. Louis plant became a part of Nordberg Company.

With regard to the older engines, every one gave excellent service and the plant has been consistently profitable, but as time passed and power demands increased through population growth and the more extensive use of electrical appliances

the engines became inadequate, and being old they were more costly to operate and maintain than the new engine. In fact, the operating saving attributed to almost continuous operation of engine No. 7, the first Nordberg installed has been reported as \$1000.00 monthly.

To install the new engine it was decided to remove one of the original McIntosh & Seymours which had of all three been placed on a single concrete mat. In the same location as the No. 1 engine of 900 hp this new unit could be installed with over five times the power of the 28 year old faithful. It would not be necessary to disturb any other engine and the connections would be adjacent to the big No. 6 and No. 7 units. Incidentally, when that old engine was installed in 1928 it represented 36% of the installed capacity and when removed it supplied only 7% for the plant's annual output had increased from 3,000,000 to 27,000,000 kw-hours.

There was some hard luck and some very good luck associated with making the installation. On August 19 the hurricane "Diane" struck and the next morning with four feet of water in the yard the men came to work in boots. It took a month to clean up after the flood, but fortunately they had been able to keep the water pumped out of the plant. An element of good luck was the fact that the generator was too big to store indoors and its shipment was being delayed to avoid storing outside. It was therefore not damaged by the flood. Engine parts in the yard were loaded with silt and to clean them was time consuming.

No substantial change in the building was needed to add the power of the new engine but it was necessary to build a small addition in the rear to house the scavenging air blower and the air filter. The generator and base was too large to bring in through existing openings and a portion of the rear wall of brick had to be taken out in order to admit the big parts.

It is an amazing fact that this big engine fits so neatly into the space originally provided for the 900 hp unit and that more big engines can be installed in spaces vacated by the older units as demands for power increase. This permits plant expansion at low cost. Another factor is the fact that the Assabet river flows near the plant and provides an unlimited supply of raw water for the cooling system which is closed.

An unusual situation is the fact that Hudson is also a public utility supplying power to near-by communities. This is chiefly the town of Stow which takes 3,652,935 kw annually compared to Hudson's consumption of 19,483,565. In the towns of Berlin, Bolton, Roxboro, Harvard, Marlboro and West Acton only 74 meters on the Hudson system are installed. Stow has 958 and Hudson has 3,447. Operating as a utility Hudson's Light and Power Dept. is licensed as such and is subject to all the laws of the state governing utility operation. The overall economy of operation must be reflected in the rates charged for the percentage of profit is limited by law. The rates for domestic service are as follows: First 40 kwhrs 5¢ per kwhr, next 100 3¢, next 160 2¢, next 700 1¢ and all over 1000 kwhrs 1½¢.

While the Nordberg diesels are among the world's best known engines and the ones of 29 inch bore are the most powerful single units built in the United States, these huge engines never cease being fascinating to the engineer and amazing to the novice. The 21½" bore engine is rated 510 hp while the 29" bore is rated 1060 hp per cylinder respectively. The design elements are generally similar in all of these engines although some use trunk pistons and others use crossheads. In general the structure consists of the bedplate, columns and the cylinder block anchored to the bedplate with long tie rods. The whole assembly forms a rigid unit. The bedplate of box design is divided into separate compartments by ribbed bridges machined to support the removable bearing shells which are made in two pieces with centrifugally cast anti-friction metal.

The cylinder head is of the simplest design with fuel injection valve in the center and cleanout holes provided for scale removal. The crankshaft is of forged steel completely machined and rifle drilled for lubricating and piston cooling oil. Pistons are two-piece with the head carrying rings and the cooling arrangement. The skirt or trunk is bolted to the head and is carried on the crosshead to which it is bolted.

In some engines the scavenging air is supplied by an attached blower, but in the case of the engine at Hudson the blower is motor driven. The scavenging air passes through a set of ports and valves. It is deflected upward and follows a U pattern as it sweeps the space clear of exhaust gases and leaves a clean charge for the next stroke.

These big engines are extremely accessible and they are designed for maximum service with minimum wear. The fuel injection is with individual pumps, one for each cylinder. The same basic design is available as a diesel, dual fuel or spark ignition gas engine. It is capable of burning what-

ever kind of fuel is available and works very well on residual or the so-called boiler fuels

EQUIPMENT LIST FOR THE NEW NORDBERG

Main engine	Nordberg
Generator	General Electric
Exciter	General Electric
Scavenging Blower	Elliott
Air Filter	American Air Filter
Intercooler	Young
Jacket Water Coolers	Ross
Air intake silencer	Maxim
Exhaust silencer	Maxim
Expansion joints	US Rubber
Raw water pump	Allis Chalmers
Jacket water pump	Allis Chalmers
Lube oil pumps (2)	DeLaval Steam Turbine
Lube oil filters	US Hoffman
Fuel booster pump	DeLaval Steam Turbine
Cylinder lubricators	Manzel
Pyrometer	Alnor
Fuel injection pump	American Bosch
Govenor	Woodward
Fuel oil centrifuge	DeLaval Separator
Magnetic separators	Dings
Dial thermometers	Auto Lite
Fuel solvent	Nutmeg Chemical Co.

It was not necessary to add to the power house in order to increase the plant capacity with new Nordberg diesels of much greater power.



DRILLING TENDER JOSEPH ZEPPA

By JAMES L. LESLIE

The tender-platform system of drilling for oil beneath the waters of the Gulf of Mexico deserves special attention these days because of (1) its simplicity of operation, and (2) its heavy reliance on diesels for prime moving power. The system is attractive to oil companies because it presents an efficient and economical method of extracting oil from the Gulf. Its assets are three-fold: it is detachable from the rig and can be easily moved from rig-to-rig or from rig-to-shore; it is easy to maintain because it incorporates a compact engine arrangement; and it is comparatively cheaper to build than other offshore power equipment because its hull can be one converted from a sea-going vessel. One of the newest of these tenders to be built is the *Joseph Zeppa*, owned by the Delta Marine Drilling Company and constructed by American Marine Shipbuilding Corporation. Both firms worked hard in building an outstanding tender. Delta Marine is a Tyler, Texas firm while American Marine Shipyards are in New Orleans. The *Joseph Zeppa* was launched at the New Orleans shipyards and represents the first tender of its type for the owning firm. It is also the first large piece of equipment to be completed by American Marine since the firm changed its name from the Alexander Shipyards Corporation.

The *Joseph Zeppa* is a converted LST. It is no longer self-propelled as it was in its LST days, because the space for power devoted to driving the vessel through the water has been taken up to drive the various generators and other equipment needed for oil rig work. The vessel is 328 ft long, 50 ft wide at deckline, and about 28 ft deep. The

outstanding feature of the tender is that all light and power is supplied to the tender and the drilling platform by an ac electrical system. On the tender are installed the main power plant, the main mud pumps, active and reserve mud pits, all drilling fluids, evaporator unit, Halliburton unit, Schlumberger unit, bulk mud, cement, and chemical storage. Fully air-conditioned, mahogany-paneled quarters are provided for 48 men and feature two recreation rooms, large cold storage capacity and ample galley and mess room space. A four man hospital is provided and helicopter deck is located over the quarters. The tender is anchored alongside the rig by the use of seven winches, four at the bow and three astern, with double cables from winches to spring buoys and chain bridles from the buoys to the anchor piles. In rig up operation, the tender deck is adequate to accommodate all of the platform drilling equipment. The 30 ton stiffleg derrick is of capacity to handle all platform items, eliminating the need for a derrick barge in either rigging up or rigging down. There are also two 10-ton cranes.

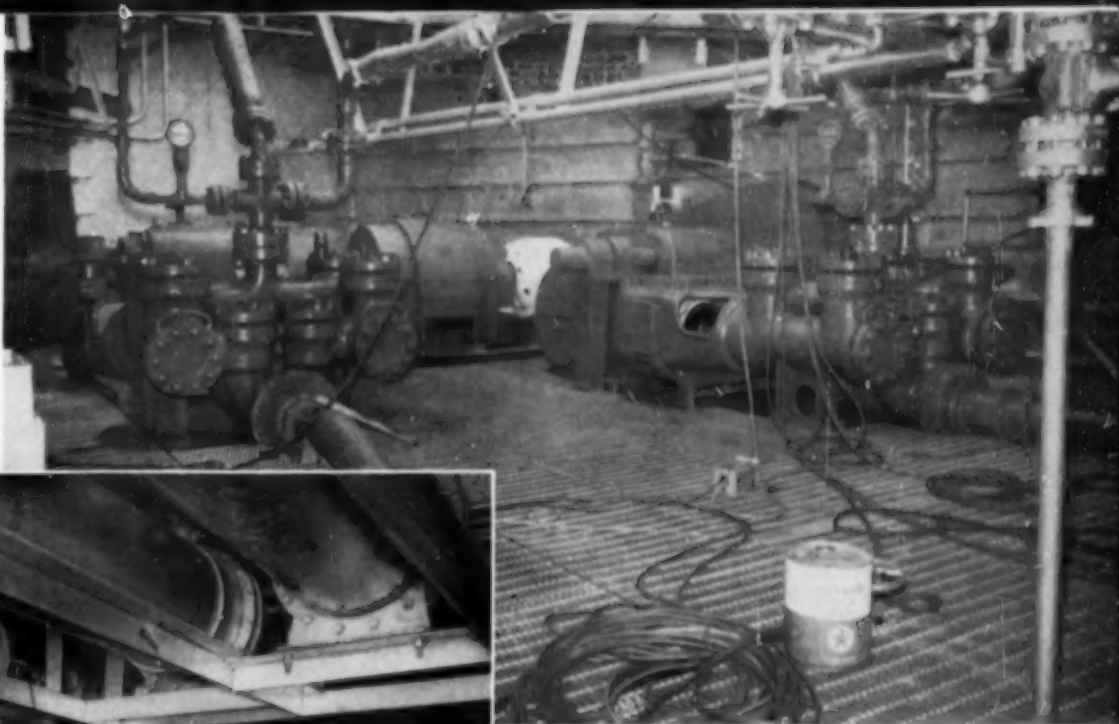
As mentioned before the power plant is unique for drilling operation in that ac power is utilized in driving the mud pumps and drawworks. Power is provided by two 12-567 General Motors Cleveland diesels rated at 1080 hp each at 720 rpm, driving Allis-Chalmers ac generators. This application, drawing all of its power from a centralized plant, accomplishes speed and torque control by the use of dc rectifier-supplied eddy-current couplings, thus introducing desirable recognized dc motor characteristics into the large ac motors.

The predominant advantages gained from such an installation are: (1) Simplicity of electrical switch gear:—in that all drilling equipment requirements and ship service are drawn from a common three-phase, 440 volt, 60 cycle system; (2) Reduction of explosion-proofing problems, with ac motors not having the sparking tendency common to dc motor commutation; (3) Minimum electrical maintenance: in the drilling operation using the ac system, the main motors will run a great portion of the time, load or no load. This feature is beneficial in that engagement of large electrical contactors is infrequent. The motors, while running in no-load condition, draw a small amount of amperage developing sufficient heat to avoid moisture problems; (4) Low control requirement: the dc power to the eddy-current couplings, supplied by rectifiers, has a maximum demand of 1½ kw for any coupling, the control of which is accomplished by an oil-immersed rheostat in an explosion-proof enclosure. All coupling controls are located at the driller's console with a duplicate set of main pump coupling controls on the tender. Motor starting is by use of low-voltage auto-transformer starters, one for each large motor application; (5) Equipment overload protection: the eddy-current coupling, by setting a predetermined maximum excitation voltage, operates as a torque limiting device, this beneficial characteristic serving to protect, not only the engine-generator sets, but also the pumps and drawworks. In pumping a plug down, excitation may be set so that, on bottoming, the pumps will stall at a specified pressure with no injurious effects to any equipment.

The *Joseph Zeppa* is flanked in this picture by a barge, but its conversion from a surplus LST was complete when this photograph was taken, the day it was launched. Notice the helicopter landing deck at right, crews quarters, beneath it, and the huge 30 ton stiffleg crane at the left end of the vessel.



The drawworks drive includes two 700 hp Westinghouse 1200 rpm 440 volt, three phase, 60 cycle motors (ac), driving through two No. 9 WCO Elmagco couplings, rated 4600 lb ft at 1200 rpm. The standby pump is an Ideal C-250 driven by 400 hp, 1200 rpm, 440 volt ac motor, coupled through a No. 8 Elmagco coupling. There is an auxiliary service plant employing one 3-268A General Motors Cleveland diesel rated at 150 hp at 1200 rpm. This diesel drives a 100 kw Westinghouse generator at 440 volts, three phase, 60 cycles, the



These giant mud pumps, unlike mud pumps on most offshore drilling equipment, are powered by ac current. The builders of the tender *Joseph Zeppa* say ac current creates greater efficiency for these big pieces of equipment.

same output as that of the Allis-Chalmers units. The standby, or emergency power unit consists of one 8-268A GM engine with 1200 rpm, 450 hp rating, driving a Columbia 300 kw, 440 volt, three phase, 60 cycle generator.

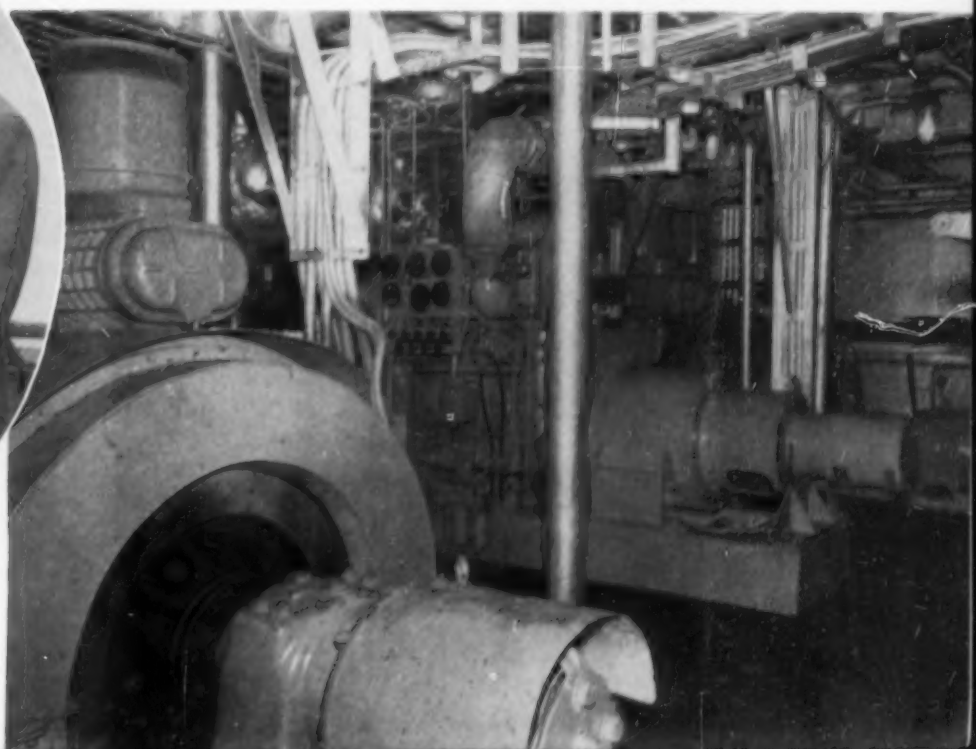
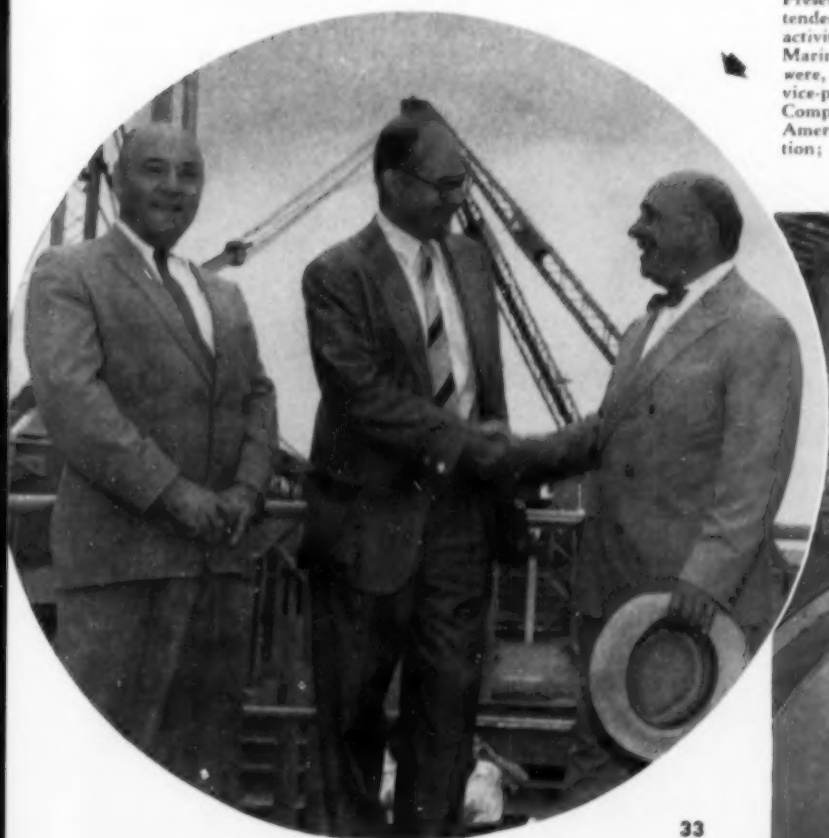
Neither of the two firms expect to be solely identified with the tender-platform system of offshore drilling. Later this year, Delta Marine will commission an American Marine submersible drilling barge, presently under construction.

The auxiliary power unit is a General Motors Cleveland 3-268A, 1200 rpm, 150 hp diesel. It powers a 100 kw, 400 volt, three phase, 60 cycle generator. One of the main 12-567 GM engines is in background.

A view of the inline arrangement of the two 12-567 General Motors Cleveland diesels which power the tender *Joseph Zeppa* and the 3-268A GM auxiliary power unit. Marquette governors are installed on all these engines.



Present on the deck of the oil rig tender *Joseph Zeppa* for launching activities August 25 at American Marine Shipyards in New Orleans were, from left, Chris Zeppa, assistant vice-president, Delta Marine Drilling Company; L. B. Durant, president, American Marine Shipyards Corporation; Joseph Zeppa, president, Delta Marine.



COMPACT NEW DIESEL FOR RAILROAD REEFER SERVICE

By L. H. HOUCK

AMERICA'S economy runs on wheels. High on the importance list are the railway reefers which deliver choice quality fruits, vegetables and meats to the tables of millions of Americans. During 1955, nearly one and a half billion pounds of frozen foods and fruits—not counting meat and staples—were moved to market. So great has this demand become, that better ways of doing the job were sought by car-building companies, railway personnel and refrigeration engineers. Speeding up transport and assurance of temperature uniformity within cars was the second momentous railroad job tackled by diesel engine builders in the diesel engine application to mechanically refrigerated reefers. Locomotives powered by diesel engines had already proved the reliability of this source of power.

Witte Engine Works' specialization in small, heavy-duty diesel engines has made possible its strong contribution to the field of railway mechanical refrigeration. The need for a low profile diesel, smooth-running and with a low center of gravity, prompted the development of the Witte Model 100RDA. This engine is ideally sized for railway mechanical refrigeration where either 40 ft or 50 ft reefers are involved. Temperatures roughly from zero to 70 degrees F in either zero cars, all purpose cars or high temperature cars, can be handled by this well-balanced, economically operating, low cost diesel engine.

Railroad requirements for a dependable diesel engine of modern design with easy service acces-

sibility are readily recognizable in the Witte 100-RDA. The ability to take rough handling during transport has been demonstrated over many months of use and its service record had indicated long periods between major overhauls. Witte's mounting, including the engine, generator and radiator is in oversize rubber shock mounts, located near the center of mass, of the horizontally-opposed engine cylinders. All accessories are conveniently accessible and there is little need to ever go inside the engine except at time of major overhaul.

The success of mechanical refrigeration has caused shippers everywhere to recognize its advantages over ice refrigeration. Temperature control within close limits delivers frozen foods, produce or meats to destination in top condition whether the ambient temperature is 110 degrees or 20 degrees below zero. Full trains of mechanically refrigerated cars can cross the continent without refueling, and of course, without stops for re-icing. An individual car, with a maximum horsepower consumption of 18 might operate as much as 10 days after arrival at destination without addition of fuel or any service attention.

This new engine, which has been under severe road testing during the past two years, was developed by the Witte Engine Works, Kansas City, Mo. Since 1944 this company has been a part of United States Steel Corporation. Witte is a pioneer builder of small diesels and has been in existence since 1876. When the engineering designs had been converted into machined steel and castings, they had a sturdy new engine of box-like construction and high rigidity. These engines have been at work on several railroads and installations of car-building corporations including Fruit Growers Express Co., Washington, D.C. and Pacific Fruit Express Co., San Francisco, in conjunction with various makes of refrigeration such as Carrier and Frigidaire and others. Refrigeration engineers from these and other companies as well as experts from the railroads and fruit transportation concerns helped with the development of the new power plant.

K. O. Nilsson, General Manager for Witte, said: "We were not refrigeration experts, nor railroad experts but we did consider ourselves to be engine builders of wide experience and competence and the new Witte Series 100 is the answer to many of the power problems of MTC." The Witte 100 has a low center of gravity, weighs 700 lbs stripped and 1700 lbs on structural steel skid with accessories and 12 kw generator. It is a four cycle, valve-in-head, engine with inherently low vibration because the two pistons and connecting rod assemblies are balanced in a flat, box-like crank-

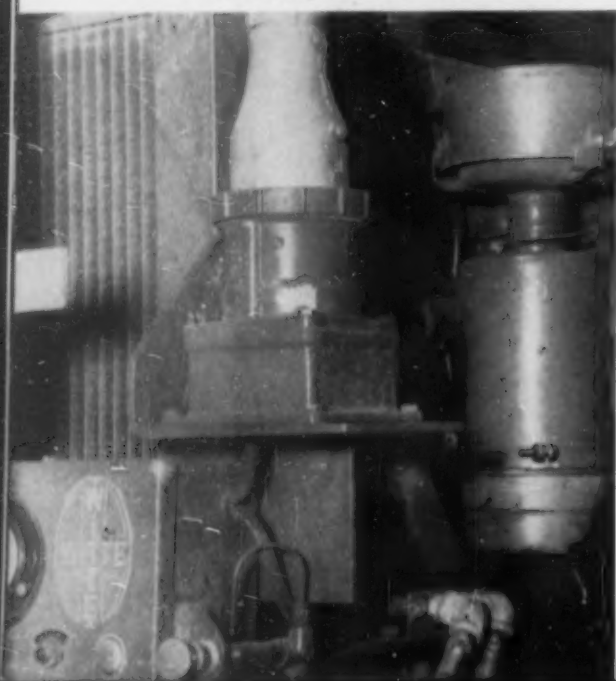


case with connecting rod journals located 180 degrees apart. The square 4x4 engine (4 in. stroke x 4 in. bore) is designed so that both connecting rod assemblies move outward and inward together at each revolution. Displacement is 100.5 cu in. and a maximum of 23.7 hp is developed at 1800 rpm. Torque at recommended hp at 1800 rpm is 55 ft lbs and at maximum hp 69 ft lbs.

It has ideal dimensions where headroom is at a premium. It lays rather than stands, 24½ in. from top to bottom and it is only 19½ in. from mounting pad to top of engine. This has a special advantage in refrigerator service because it avoids the pull directed against the top of a high engine. The bare engine is 39 in. wide, and 25½ in. long and only 66 in. long with its direct-connected generator skid mounted. Stability is a strong point in the engine's design. Widely spaced engine support pads are only 6½ in. below the crankshaft center line—near the center of mass. Adequate anchorage is not only easy to accomplish with fastening to the steel skid but positive anchorage is assured even when subjected to severe shock and twist of high speed transportation and modern, speedy, yard switching. Actually the engine-generator unit will operate in its rubber-mounted cradle on its structural steel skid at full load continuously without provision for holddown when it is in stationary use.

Witte engineers accomplished another feat by making the compact design readily serviceable. Sacrifice of one advantage for another is common in engineering but in this case the design was accomplished without penalizing the serviceman. For instance, the crankcase is accessible from the top by removing a plate instead of dropping a pan beneath the engine. Most service operations can be performed on top of the engine where there is the most room even in its limited quarters in a reefer. All servicing other than a major overhaul can be done through the top of the engine. A Roosa Master fuel pump package is top-mounted. Held down by two nuts it is easily accessible. This package contains injection pump, hydraulic unit, fuel transfer pump, governor and solenoid shut down. The shut down is actuated by high water temperature, overspeed or low oil level.

Front end view of Witte model 100-RDA installed in a refrigerator car. Right, Vortex wet-type air cleaner for right cylinder, center is weather-proof receptacle for generator output and bottom left, Chevron low temperature starting equipment, normal starter and stop buttons and hour meter.





40-ft, 50 ton Frigidaire-equipped for 32 to 70 degree range mechanical refrigerator car built at Alexandria, Va., in 1933. It has a single 5 hp sealed compressor unit. Power is Witte 18 hp Model 100RDA diesel direct-connected to Delco 12 kw alternator power unit. Car is equipped with rubber cushion draft gear, Barber S2C trucks, one wear steel wheels and has meat loading rails. Machinery compartment is behind sliding door at left.

Nozzles are American Bosch, mounted on the end of each cylinder just above the valve cover casting, making them readily reached for service.

Engine is started at normal temperatures by a push button located on a centralized control panel at front of engine which can be reached by a serviceman standing on the ground when the engine is installed in a car. Starting system is a 12-volt Delco-Remy system with conventional generator and starting motor and voltage regulator. A Chevron pressure priming system is used for

cold starting and is also mounted on the same panel, which has a running hour meter. The Witte 100 can be started, stopped, filled with lubricating oil, drained, have its oil level checked with bayonet stick, all at one point just below the radiator, when installed in a reefer. Reefer engines do not stop and start by thermostat as does the refrigerating equipment but must operate constantly. Fuel for this job is supplied from 400-gal. tanks.

The inherently regulated 12 kw direct-connected alternator having characteristics of 220 volt, 3 ph,

This Witte Model 100RDA trailer-mounted unit which can be pulled by any automobile is an exact duplicate of the Witte Model 100RDA diesel engine-generator unit inside the car. Note that the power connection is plugged into the power outlet and is operating the refrigeration machinery within the car. This trailer may be quickly transported at maximum highway speeds and illustrates the feasibility of its use at check points and sidings during inspection and servicing of the car engine. In the event of freight car collision or derailment where the engine within the car is put out of service, the trailer-mounted unit becomes a quickly available source of power to keep the car contents under refrigeration.



60 cycle, was developed especially for railway service. It was one of the first units in this type of duty to eliminate external regulation and to simplify electrical circuits. The generator is built for Witte by Delco Products Division of General Motors Corporation, Dayton, Ohio. Generator current is carried from the front of the engine through an all-weather receptacle and cable to the panel which feeds the two 5 hp compressors, the condenser and the blower fan.

Engine can be serviced in the railroad yards by a man standing on the ground and all service operations short of a major overhaul can be accomplished through the top of the engine where there is the most room in the cramped quarters of the railroad reefer.



Roosa fuel injection pump package is mounted on top of engine on two studs. Package contains injection pump, fuel transfer pump, engine governor and solenoid shutdown actuated by low oil pressure, high water temperature or overspeed.



BEMIDJI, MINNESOTA

**Progressive Utility Company Protects Service
To Consumers, Operating Two Fairbanks-Morse
Opposed-Piston Engines at 900 R.P.M. To Provide
4800 Horsepower In 25 By 35 Foot Space.**

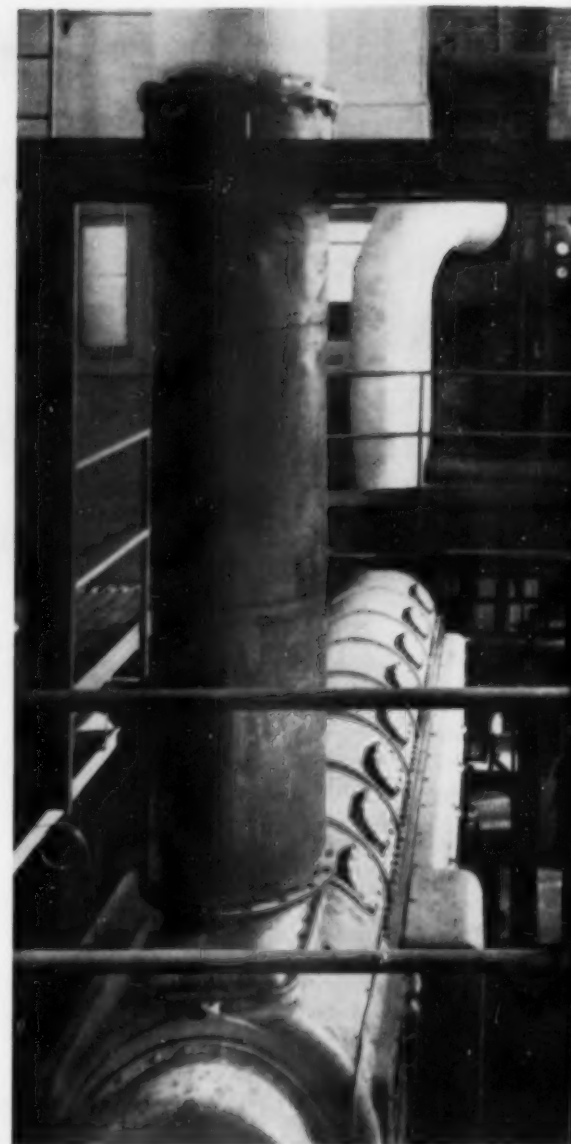
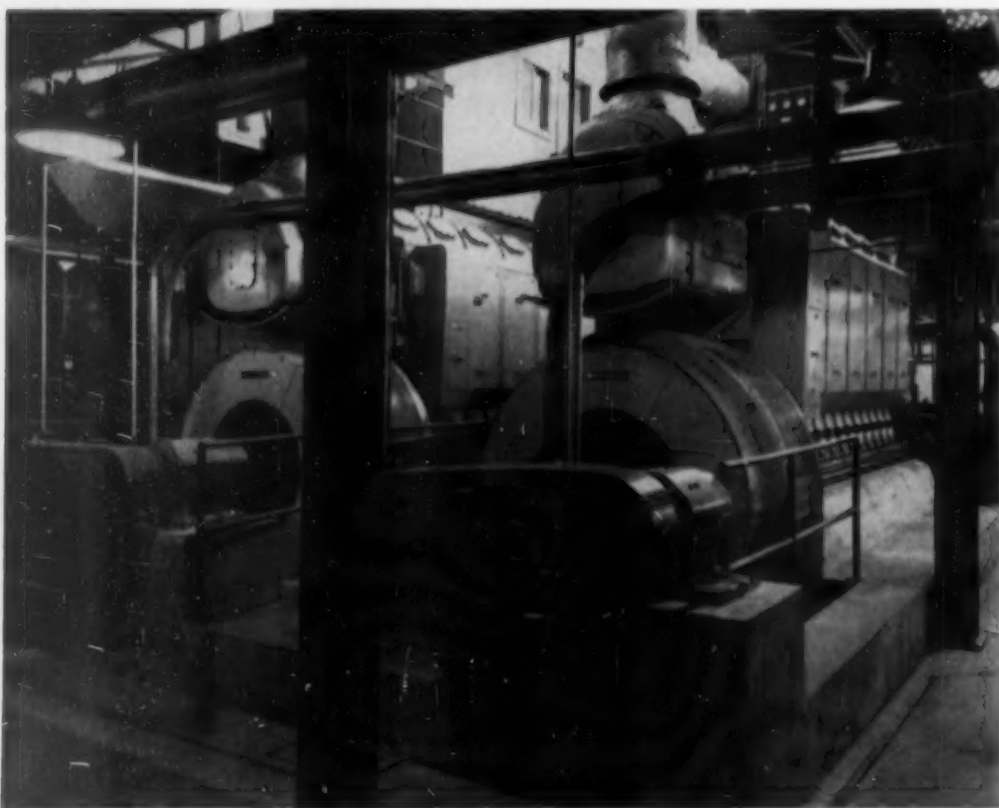
THE first Model 38D8-1½ opposed-piston stationary diesels to operate at 900 rpm have completed over two years of standby and peaking service in the Bemidji plant of the Otter Tail Power Company. Installed in a space measuring just 25 by 35 ft. the two engines provide a combined capacity of 4800 hp. Otter Tail Power Company is a progressive utility company with a consistent record of expansion and improvement of service to its customers. Headquartered at Fergus Falls, Minnesota, the system extends over a three-state area serving 486 communities in Minnesota, North Dakota and South Dakota. It is company policy to provide maximum protection against outages, utilizing carefully spaced generating facilities as well as interconnections with adjoining power systems. In the past five years, the company has spent more than \$20,000,000 on improvement of transmission and generating facilities. At the end of 1954, Otter Tail had nine steam, seven hydro and 24 internal-combustion generating plants with a total name plate capacity of 123,290

kw. In the year, these plants produced 421,328,000 kw hrs. of the system's 563,150,000 kw hr total.

As part of its improvement program, Otter Tail retired from service in 1953 an aging 2500 kw steam turbine at Bemidji, Minn., leaving a 3000 kw steam unit still in service as a base load generating unit. A replacement for the retired turbine was considered essential for a number of reasons. First, the company had no wish to reduce system capacity in the face of an expanding load. Second, the Bemidji plant is out near the end of a long transmission line and, in the event of a line outage, would be called upon to serve the city of Bemidji with its 10,000 population. Third, it was considered sound operating policy to have a standby unit in the plant to carry the station's normal load during emergency or scheduled maintenance of the steam turbine.

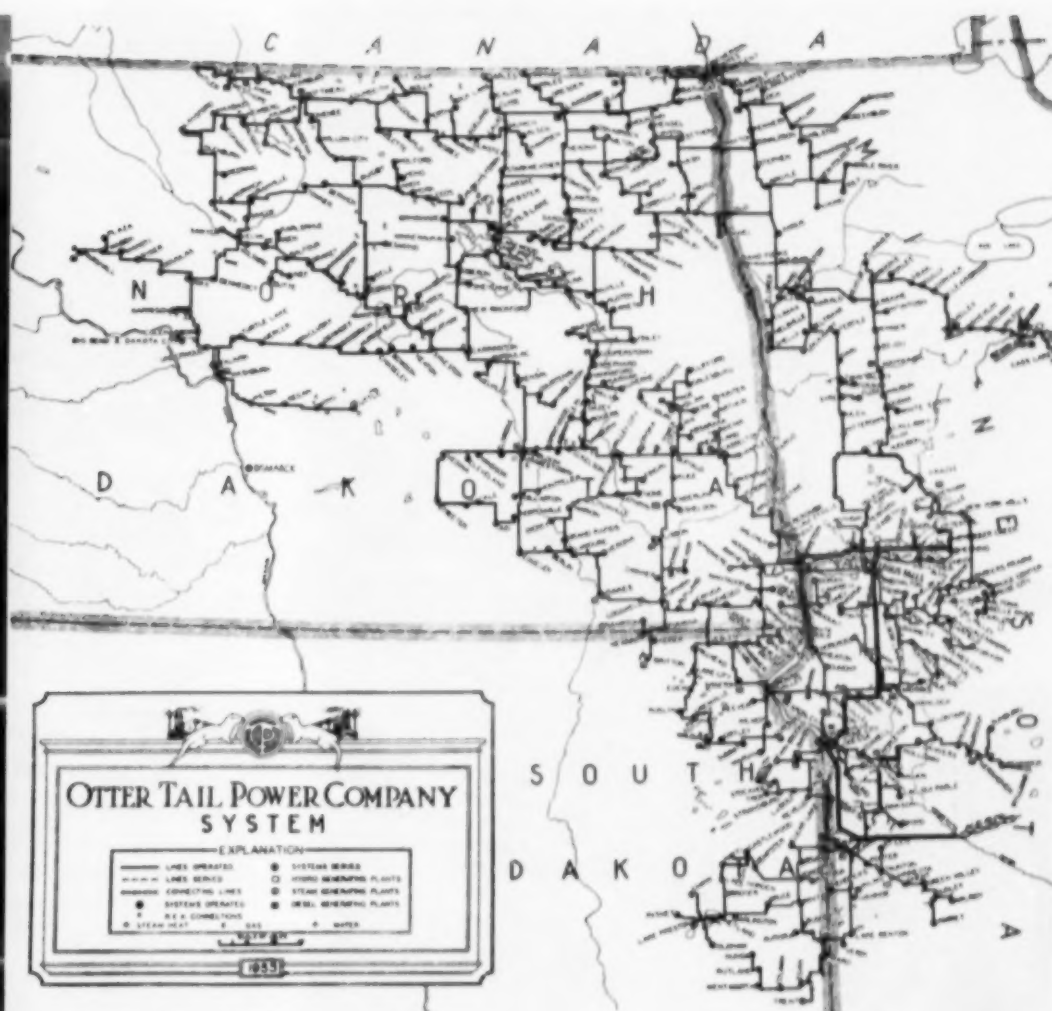
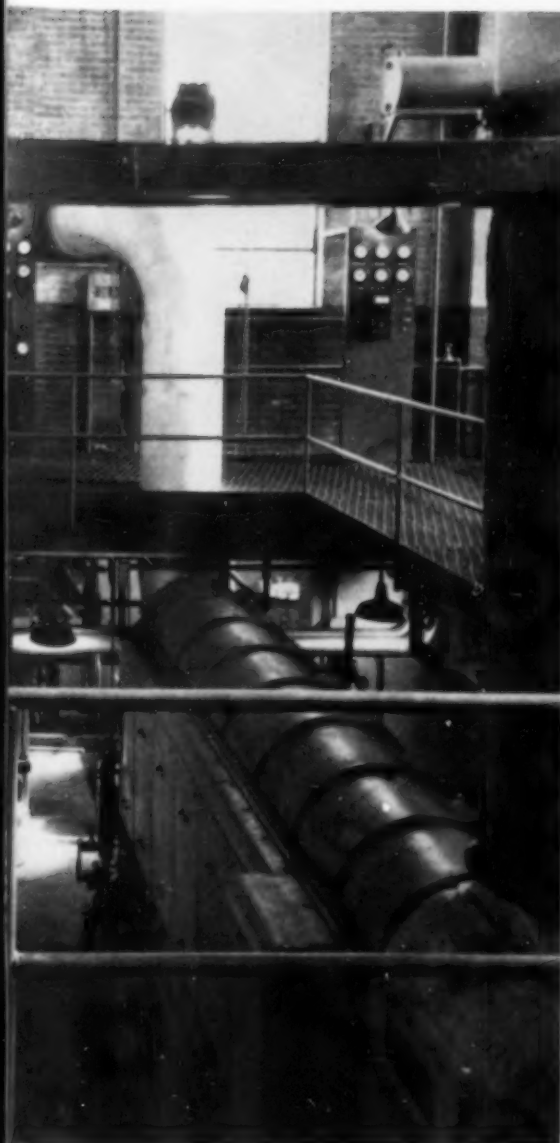
Diesels were chosen for this installation rather than another steam turbine because they provided

Two Fairbanks-Morse opposed-piston diesels operate at 900 rpm to provide 4800 hp for standby and peaking service in the Bemidji plant of Otter Tail Power Company. The two engines drive two 1700 kw F-M alternators and are installed on a common foundation in the space formerly occupied by a 2500 kw steam turbine.



a great deal of horsepower in limited space and permitted quick emergency starts. It was calculated that a turbine would take from 60 to 80 minutes to put on the line while a diesel installation could be so engineered that it could be started, put on the line and brought up to full load within 10 minutes. The engines installed at Bemidji are two identical Fairbanks-Morse two-cycle opposed-piston diesels, each with 12 cylinders of 8½-in. bore and 10-in. stroke. Each is rated for this standby service at 2400 hp at 900 rpm and drives a 2125 kva, 1700 kw, 2400 volt alternator.

The two diesels with 3400 kw capacity were put in the position previously occupied by the 2500 kw turbine. It took a month to remove the steam unit and cut the foundation down 18 ft to the footing supported on pilings. Then a common foundation with steel reinforcement was poured on the original caps. A common foundation was possible because the opposed-piston design eliminated danger of harmonic vibration. Installation of the engines was speeded because the 3000 kw turbine was carrying the load without relief and was long past the normal period for scheduled maintenance. The generators, last piece of major equipment to arrive reached the site on September 29th and the two diesels went into operation exactly a



The foundation of an obsolete 2500 kw steam turbine was cut down 18 ft and a new common foundation poured over the original caps and pilings for the two new engines. Opposed-piston design eliminated danger of harmonic vibration. For operator convenience, the gauge and alarm panels with Alnor pyrometers are installed at turbine floor level.

Map of the Otter Tail Power Company. The Bemidji plant (at upper right) is out near the end of a long transmission line and, in the event of a line outage, would be called on to serve the city of Bemidji with its 10,000 population.

month later on October 29th. Then the turbine was shut down after 18 months of service and the new diesels ran without shutdown for 27 days while maintenance was performed on the turbine. The plant is on the shore of Lake Bemidji with engine room floor just 2 feet above lake level. Since a basement could not be constructed, a 16 by 28-ft addition was built to house the diesels' auxiliary equipment. The engines were tied into the steam plant's cooling system with a pair of 5-in. 800 gpm motor-driven centrifugals to circulate the jacket water through engines and overhead heat exchangers. Since these engines are intended for emergency use, Otter Tail engineers devised systems that would keep both cooling water and lubricating oil warm at all times, facilitating quick starts. The system includes four thermostatically-controlled electric heating units, two for water and two for oil, and small motor-driven circulating pumps. During normal operation, lube from each diesel is drawn from one end of the crankcase, put through a heater into a filter with 16 cellulose cartridges, and then returned to the opposite end of the crankcase. There is also a full-flow lube filter and a lube cooler in the engine's pressure circuit.

Scavenging air for each engine is drawn through a pair of oil-bath filters located inside the building but arranged to draw air from outside. Air then passes through right-angle in-line silencers to the engine-driven blowers. For operator convenience, the gauge and alarm panels for the diesels are located on the upper level with the turbine and switchboard. The diesels utilize fuel oil but can be converted to dual-fuel operation if natural gas becomes available. The two opposed-piston engines were installed primarily to serve in emergencies and to carry the normal load during maintenance of the steam equipment and is fulfilling these functions. The engines run steadily for about three weeks a year while turbines, boilers and other elements of the steam plant are overhauled. In addition, rapid growth in system load has pressed the diesels into further service. It is now established practice to run at least one of the diesels for three or four hours a day to help carry the peaks.

With this careful blend of hydro, steam and diesels, Otter Tail Power Co. provides its growing family of customers with an ample supply of electricity at steady voltage and with maximum protection against interruption of service.

List of Equipment

Engines	Fairbanks, Morse Two 12-cylinder, 8 1/2 x 10-in., 2400-hp, 900 rpm. Model 38D8 1/2, two-cycle opposed-piston diesels.
Alternators	Fairbanks, Morse Two 2125 kva, 1700kw, 80% pf, 3 ph 60 cycle, 2400 volt, Type TGZO alternators with 15 kw, 125 volt, direct-current exciters.
Governors	Woodward
Fuel level meter	Midget Levelometer
Fuel filters	Briggs and Nugent
Lube oil	Standard HD. (Ind.)
Lube filters	Briggs and Air-Maze
Lube coolers	Ross
Pre-lube pumps	Roper
Thermostatic valves	Fulton Sylphon
Air filters	American Air Filter Co.
Intake Silencers	Air-Maze
Indicators	Kiene
Exhaust pyrometers	Alnor
Starting air compressor	Gardner-Denver



Two Cummins Vee-type, 12-cylinder turbocharged diesels with a maximum power rating of 600 hp each, drive Westinghouse ac generators in this power car which also carries an electric kitchen for limited meal preparation.

BUDD'S NEW TUBULAR TRAIN

By ARNOLD B. NEWELL

THE newest Budd train is admittedly designed and built as a bid for business in a new rail-roading era in which major emphasis will be placed on lighter weight and greater comfort. In more than name, trains built by the Budd Company of Philadelphia are *Pioneers*. For example the celebrated diesel-electric streamliner *Pioneer Zephyr* placed on the Burlington route some 22 years ago was a distinct departure from the then conventional train design. It's still running today. The newest contribution to railway modernization is *Pioneer III* developed for general use without vast changes in overall train operating practices. It is not essentially an integrated streamlined diesel operated train and the only reason that it may be drawn by diesel locomotives more than other types is that steam is nearly gone and forgotten while electrifi-

cation represents a comparatively small part of overall rail transportation systems. This train can be employed with any kind of locomotive, but it is heavily dieselized to provide head end power.

The power car located at the head of the train, coupled to whatever kind of locomotive may be doing the hauling, is equipped with a pair of 12-cylinder Cummins diesels, each driving a 265 kw Westinghouse generator. While these engines are rated back to 400 hp for continuous service, each one has a top rating of 600 hp. Regardless of rating in this particular class of work it is somewhat amazing to learn that one train can need diesel-electric power totalling 530 kw to provide the various comforts and amenities of passenger life on wheels. If head end power is available at

the locomotive, the power car could be dispensed with. In the case of the new trains on the Pennsylvania system between New York and Washington, D.C., the power car also has some 18½ ft of length equipped with an all electric kitchen where light meals will be prepared. It is believed that concentration of the total train power requirements in one car instead of having each car produce its own electricity is an important factor in reducing costs and simplifying maintenance.

The electric system is 440 volt, 60 cycle, 3-phase ac on train lines connected through jumpers to each car. A control line is included which will open a breaker on the head-end car before jumpers can be separated. Ac power permits use of high efficiency fluorescent lighting, fan and blower in-

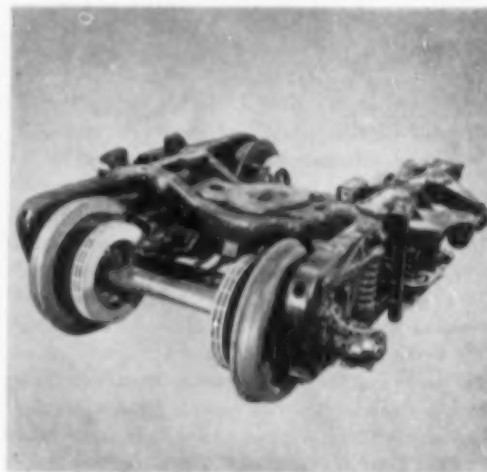
duction motors which are of lighter weight and lower in maintenance costs, and more important are the sealed maintenance-free air conditioning units usable with ac power. In addition the storage batteries, axle driven generators and other dc equipment commonly found on conventional coaches are all eliminated. Electric generated steam heat is employed and distributed by means of a steam trainline to side wall radiation in each heater duct and to a fresh air heating coil forming a part of the air conditioning equipment. Car temperature is under thermostatic control.

It is apparent that a train requiring so much diesel generated auxiliary power to provide so many comforts and conveniences for passengers is considerably out of the ordinary. The original concept was a train for commuter service and for middle distance runs where daily mileage is too low to support operating costs. The result has been a low slung stainless steel car meeting the strength and safety requirements of the Association of American Railroads yet of the lightest

weight per passenger of any car built thus far in the USA. The basic car can be adapted to almost any kind of passenger service. It has the standard 85 ft length, weighs 595 lb for each of the 88 passengers carried compared to 1678 lb for each of the 74 passengers carried in a standard coach. While the new coaches are almost two ft lower than the newest conventional cars they have an interior appearance of spaciousness. The center of gravity is 45 in. above the rails which is nine in. lower than ordinary cars.

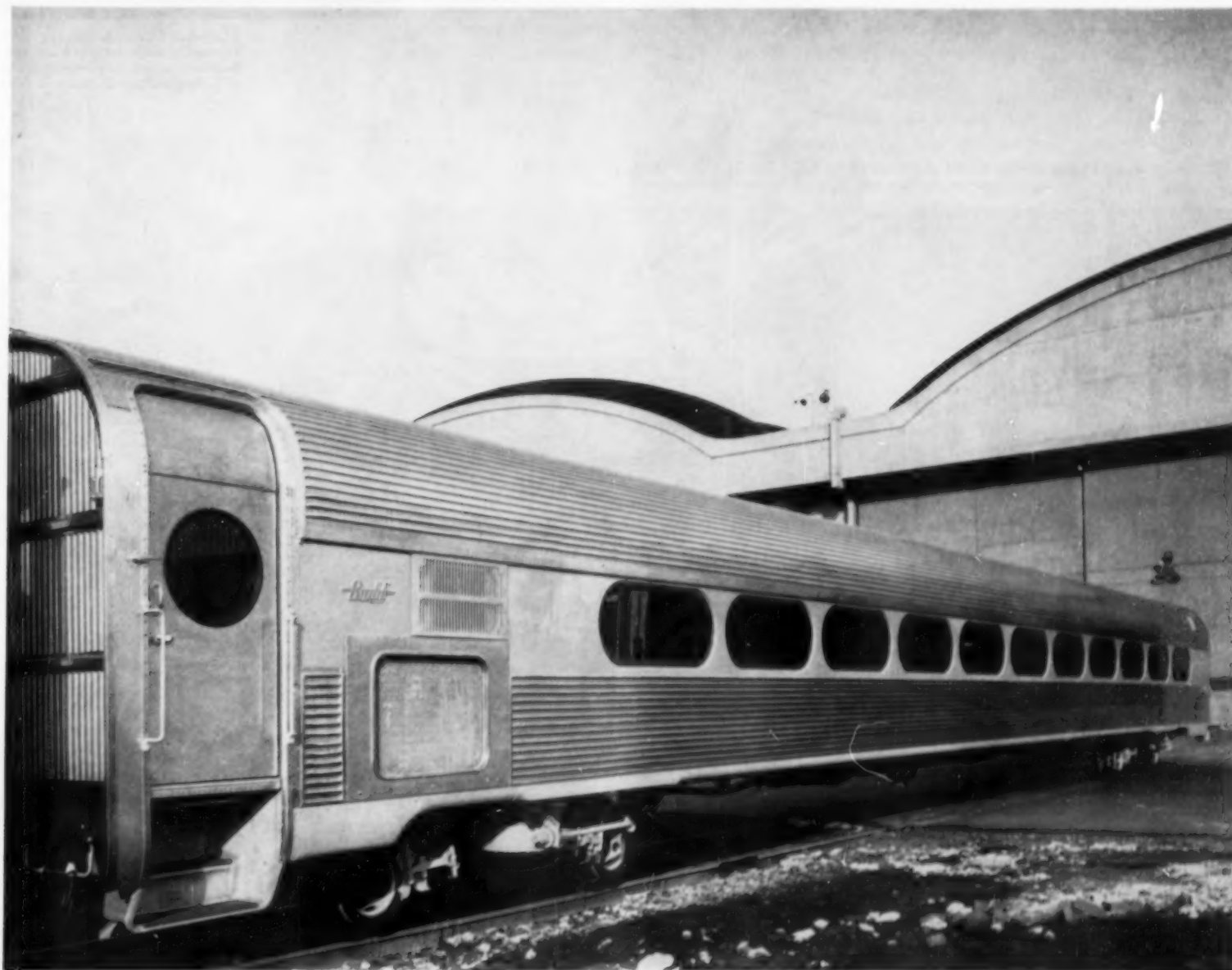
The tubular train on the New York-Washington run has seven coaches seating 574 passengers and the head end power car. Each car rides on 4-wheel roller bearing trucks employing smaller wheels than standard trucks. Structurally the floor and sides constitute a strong car-length tube of low weight thus doing away with the usual heavy steel underframe. There is a split level interior effect with the middle section of the car somewhat lower than the end sections. The interior is plastic throughout. In this way weight reduction is

achieved along with lowered maintenance costs. The new train was developed by the Mechanical Research Committee set up by six railroads including the Pennsylvania. It can be adapted to all classes of passenger services.



▲ The truck has smaller wheels than standard trucks and Budd disc brakes for smoother action.

The sleek, low slung Pioneer III, weighing 52,330 lbs and seating 88 passengers, is one of the lightest railway passenger cars meeting standard strength requirements ever designed. Combining all-stainless steel construction methods with radical new engineering and an extensive use of plastics for interior fittings, The Budd Company developed this super-light-weight, 595 lb per seat car. It was first shown to a group of railroad presidents at the Waldorf Astoria recently.



NEW TOWBOAT ADDED TO MATERIAL SERVICE FLEET

ONE of the largest and most powerful towboats ever built for use on the Chicago River system was added to the Material Service Corporation's fleet of seven diesel towboats on Monday, September 10, 1956. Officials of the various waterway divisions of the City, State and U.S. Government were present for the christening. The motor vessel was named in honor of Mr. George W. Lenzie, a Director and Vice-President in Charge of Production of Material Service Corporation. Built by the Calumet Shipyard and Drydock Company of South Chicago at a cost of approximately \$500,000 the towboat is powered by a pair of Nordberg Supairthermal diesel engines. The 110 ft motor vessel has a 30 ft beam, draws 7 ft 9 in. of water and incorporates such features as a telescoping pilothouse and especially designed steering and backing rudders to permit it to operate effectively on the narrow Chicago and Calumet Rivers.

The *M/V George W. Lenzie*, built by Calumet

Shipyards, is designed along the same lines as Material Service's *M/V Irving Crown*, which is also powered by Nordberg Supairthermal engines. The new towboat is 7 ft longer, has greater fuel capacity and provides even more spacious quarters for the crew. The *Lenzie* is capable of pushing eight 195 ft x 35 ft barges, loaded with 12,000 net tons of material, up stream at six mph. The main propulsion engines furnished to Material Service Corporation for the *George W. Lenzie* are duplicates of those furnished a few years ago to power the *Irving Crown*. The two Supairthermal engines are of the four-cycle, heavy duty direct reversing marine type with six cylinders of 13 in. bore and 16½ in. stroke. They each develop 800 hp at 275 rpm and operate at 176 lbs bmep.

Nordberg engines were again selected by Material Service Corporation because of the excellent performance of the engines on the *Irving Crown*. Like that vessel, the second Nordberg powered boat to



Just prior to the christening of the *M/V Lenzie*, Colonel Henry Crown, board chairman of Material Service Corporation, looking on while Mr. Lenzie's daughter, Georgia Ann Fisher, holds the champagne glass.

Colonel Henry Crown, board chairman of Material Service Corporation, proudly looks over one of the Nordberg engines in the new towboat.





On the M/V Lenzie, we find this interesting group: Colonel Irving Crown, Material Service's Chief Engineer, Mrs. Robert Singletary, the former daughter of Mr. George W. Lenzie, and Mr. George W. Lenzie in the background.

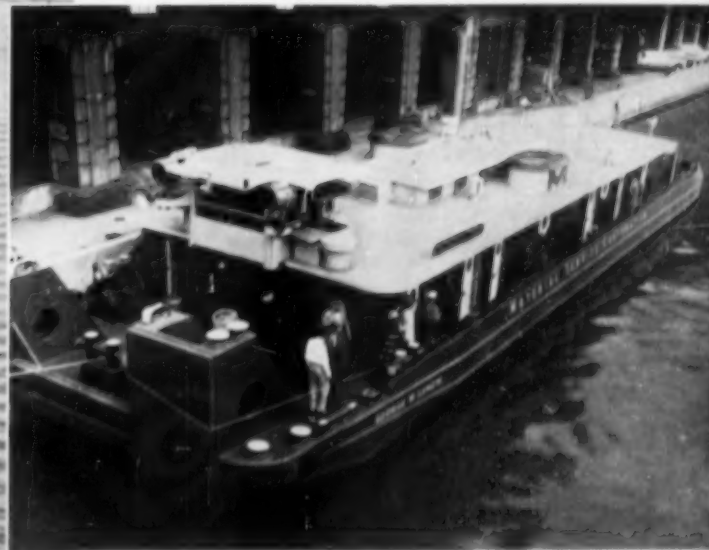


join Material Service's fleet uses the Nordberg Supairthermal system which enables the engine to produce high horsepower in a limited space while providing the advantages of a slow speed direct-drive unit. The rating of the engines aboard the *Lenzie* are somewhat higher than the *Crown* and they develop their 800 hp rating at a lower rotational speed, thereby permitting a larger propeller. The engines turn 82 in. diameter stainless steel propellers and the towboat is fitted with Kort nozzles that greatly increase the thrust developed by the diesels. The nozzles are covered with $\frac{3}{8}$ in.

stainless clad steel on the inside surfaces, where the effects of erosion are expected to be greatest. The Kort Nozzles also give protection to the propellers at the frequent locations of low water and rocky bottom in the Chicago River. Some of the auxiliary equipment contributing to the successful operation of the pair of Nordberg diesels propelling this fine new towboat are: Winslow oil filters; Gardner-Denver air compressors; closed cooling system using Young cellular-type exchangers; American Air filters; Maxim silencers, and an Elliott turbocharger for each engine.

The M/V *George W. Lenzie* is equipped with two steering rudders, one astern of each propeller and four backing rudders, two ahead of each propeller. They enable the towboat to be maneuvered in a sideways direction when taking the barge tow around bends in the river and at close places in the inland river harbors. The new towboat has a liquid storage capacity of over 40,000 gallons. She will carry 30,000 gallons of fuel, 1600 gallons of lubricating oil, 7000 gallons of potable water and 2000 gallons of filtered water. The *Lenzie's* telescoping pilothouse is mounted on top of a hydraulic lift that has a 9 ft raise. When approaching the numerous low bridges along the Illinois Waterway route, the pilothouse can be quickly lowered into the lift well. The pilot fully controls the boat to maneuver the *Lenzie's* tow from the pilothouse which is fitted with a complete Westinghouse Air Brake Control System.

A four channel Ship-to-Shore radio and a mobile telephone are also installed in the pilothouse, so the Captain can maintain constant communications with the Corporation's dispatch office. The towboat will bring sand, gravel and limestone from Material Service quarries as far south as Henry, Illinois, to the Corporation's distribution yards located along Chicago area waterways. Adequate communications are an important part of the integrated operation of this building material supply corporation. Clifford Halstead and John Cox have been assigned as ship's Captain and Chief Engineer respectively on the new towboat by the Material Service Corporation.





Dig those mighty arms of the dieselized Northwest shovels! Closeup of an Eaton & Smith shovel on the Nacimiento Dam.



Service break for a couple of the big Euclids with Cummins engines up the river at the field shop.

DIESELS HELP BUILD NACIMIENTO DAM

By F. HAL HIGGINS

THE Nacimiento Dam at the upper end of the Salinas valley offers an interesting study of dieselized tools being chosen by skilled earth construction contractors in a race to beat the deadline of nature. Like most Pacific Coast dirt construction jobs that started late last year, the contractors were caught by the December floods that largely wiped out their early work and delayed the 1956 repairs on their 1955 work and the continuation of programs keyed to dead-line dates for completion.

In addition to the vagaries of nature in pouring down the heaviest rains in nearly a half century late last December, the problem of gathering, teaming up and holding skilled labor in these days of so many big construction jobs is one that has every contractor in the dirt moving game jumping. Man power consumes a big share of the contractors' attention as there is a real shortage of men with experience. Men make a lot of difference in the handling of big diesel machines. Keeping scrapers, tractors, shovels and draglines at work instead of in the shops for repairs is as much a matter of operators as well as the service sold by the top manufacturers of the rugged tools developed over the past half century since mules and steam gave way to gasoline and diesel. The machines get bigger, faster and better each year in this free swinging free enterprise competition for the big jobs like this one.

This Nacimiento dam is a two-duty project for the Monterey County Flood Control and Water Conservation District. Its construction was won on a bid of \$4,178,888 by Eaton & Smith and James M. Smith as a joint venture. The famous Bechtel Corporation designed the dam and appurtenant works, prepared the specifications for competitive bidding of contractors, and supervise and inspect the construction for the Monterey district. The dam is an earthfill structure faced with rock on the upstream side. It will have 3,200,000 cu yds of compacted material with an impervious core when completed to hold 350,000 acre feet of water. Maximum height will be 260 ft above lowest part of foundation. Included in the project are a cutoff trend for full length of dam, foundation grouting, gateless concrete spillway on the left abutment, and a low-level outlet works under the embankment of the dam.

The disastrous floods of last December stopped the job till early January when a single shift was started to clean up the debris and allow the stream to subside for the 2-shift program that started in March when man power went up to 160. By May, it rose to 250. The job is strung out up and down both sides of the Nacimiento River, which empties into the Salinas River. The fleets of Euclids and Cat DW scrapers keep both roads busy as they shuttle back and forth from borrow pits to dam

at 15 to 35 mph. Rippers loosen tough areas for scooping up by Cat DW's while the two big Marion draglines powered by twin GMC and Cat engines scoop up and load the big belly-dump Euclids with Cummins engines. The compacting at the dam is a job being done by Cat and Allis-Chalmers tractors pulling Southwest and LeTourneau-Westinghouse sheepfoot and compactor units.

The answer to that recent popular song, "You gotta have heart" can be seen here as well as on all the big road jobs the writer has been on this year. Every contractor with his reputation and money staked on his ability to win a contract on his competitive bid against the smartest competition tries to select and buy machines that will stay on the job and out of the shops. Down time costs him both time and money. He looks in on his headquarters and field shops the minute he gets on a job to see what is down. Not an engine was loafing on its own account on this Nacimiento dam job the day the writer was there.

In the field of fuel and grease for the diesel engines and the machines they power, the visitor was lucky enough to glimpse a big Peterbilt tanker and trailer with Cummins engine arrive from Fresno. Seeing it descending the steep narrow road down the canyon to the river, he followed as it eased down to river bed, crossed the heavily travelled road to the opposite side and then it climbed out of the canyon and backed into position at the big diesel fuel supply tank with its Texaco sign marking the location for the service trucks that meet the hard working scrapers, water wagons, graders and tractors at handy spots for refueling, greasing, etc., at designated periods. The oil field products service is so smooth and dependable, scarcely anyone gives it a thought. It is accepted as nothing to worry about. It takes trouble



Humble's Tank Truck Service delivering a tanker and trailer load of diesel fuel for Texaco on the Nacimiento Dam construction job to keep the fleets of Euclids, Cats, Marion and Northwest draglines and shovels rolling, digging, placing and packing in a 2-shift 200-day race to get the dam high enough to be out of the reach of Nature's winter storms, which last December washed away two months work. It is a Cummins engine under the hood of the Peterbilt truck.



Management on the Nacimiento Dam: Les Lynch, Eaton & Smith's Engineer; Dave Culver, Bechtel's Resident Engineer; Andy Cathy, General Superintendent for Eaton & Smith; Jim Seger, Project Manager; and Bill Smith, member of the Eaton & Smith firm

to make news, which means no news is good news, and oil has it in not making news on heavy construction jobs. Oil does its research in its laboratories far from the jobs where it smooths the machine action and powers the machines that cut costs in time and men to permit contractors to win bids and harness the water that falls on California for the state's mushrooming population.

In 200 days of two 10-hour shifts these diesels have to lift this dam above the danger point before

winter rains can stop or slow down action. Oil field products will both smooth and power the engines to dig, load, carry, place and pack the earth on schedule. The problems encountered and licked here by Eaton & Smith will add to that contractor's know how for the conquest of other jobs, bigger and smaller, easier and harder. The construction game has always had its elements of gamble against nature and its acts of God. But the contractor's power tools of today and his accumulated experience take much of the old time gamble out of the game. This risky and important American earth moving that started its engineering way back in the Erie Canal days, before the era of railroad building, began to give the U.S. a real class of construction engineers to conquer frontiers and harness streams for a growing population. The diesel engine has taken over from the bulls and mules after the steam and gas power interval to multiply man power and reduce hazards. This power is in full flower today.

Across the Nacimiento River a glimpse of a twin engine GM diesel unit which powers a Marion dragline as it loads a fleet of Euclid belly-dump trucks powered by Cummins engines



TORQUE CONVERTERS FOR MARINE APPLICATION

By W. L. BODE

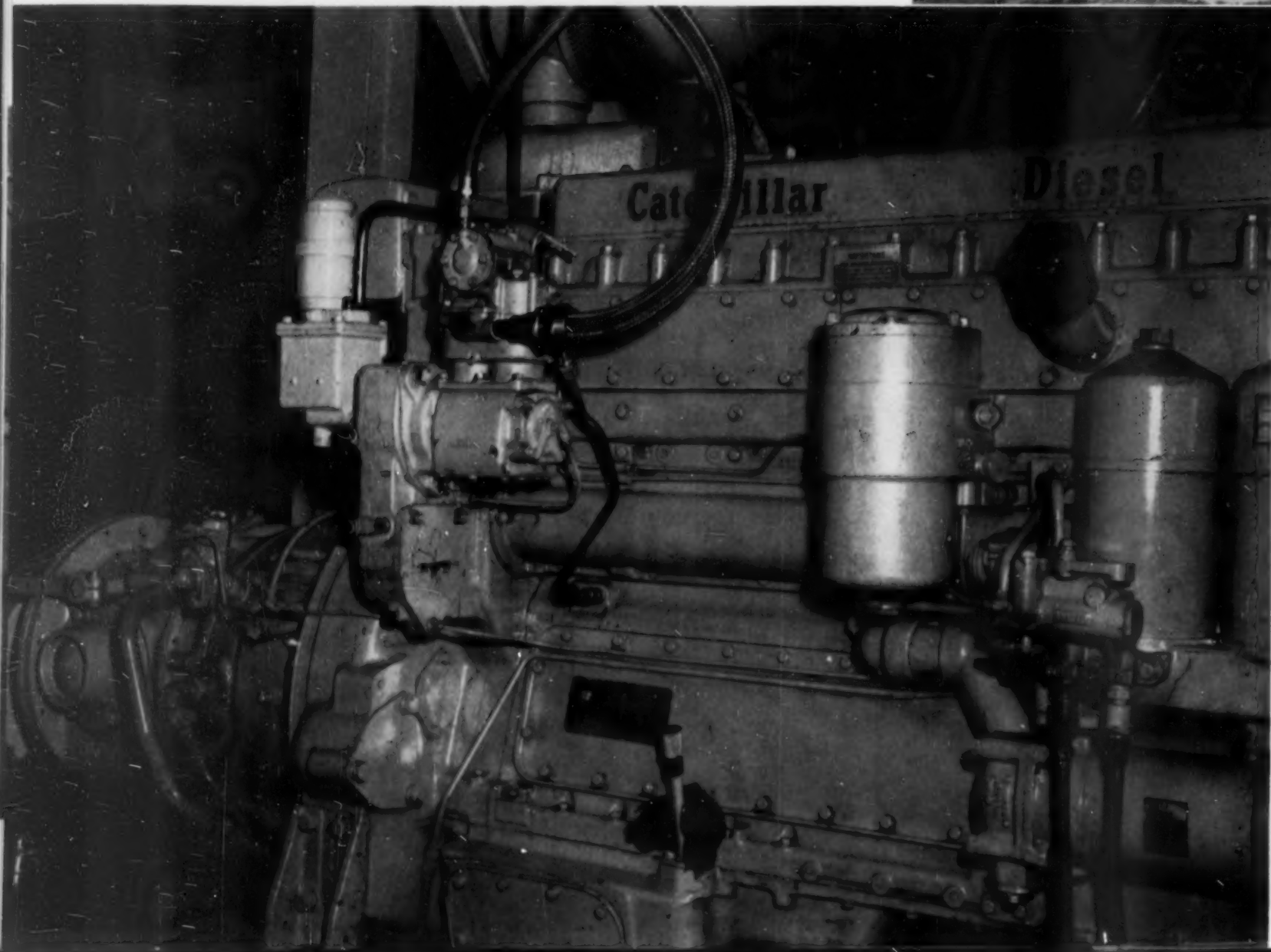
AMONG the multitude of those pursuing new methods of proper power transmission, is the Marine Industry. And here, as in so many other instances, an important trend is to torque converters, even though these units are not as commonly associated with marine equipment as they are with crawler tractors, excavators, logging yarders, construction hoists, dock cranes, locomotive cranes, oilfield slush pumps, oilfield drilling rigs, industrial locomotives and off-highway vehicles. The primary uses of torque converters on marine installations are found in fishing boats, especially in trawling; in marine construction derricks; in work boats of different types; in dredging operations; and in a variety of other related applications.

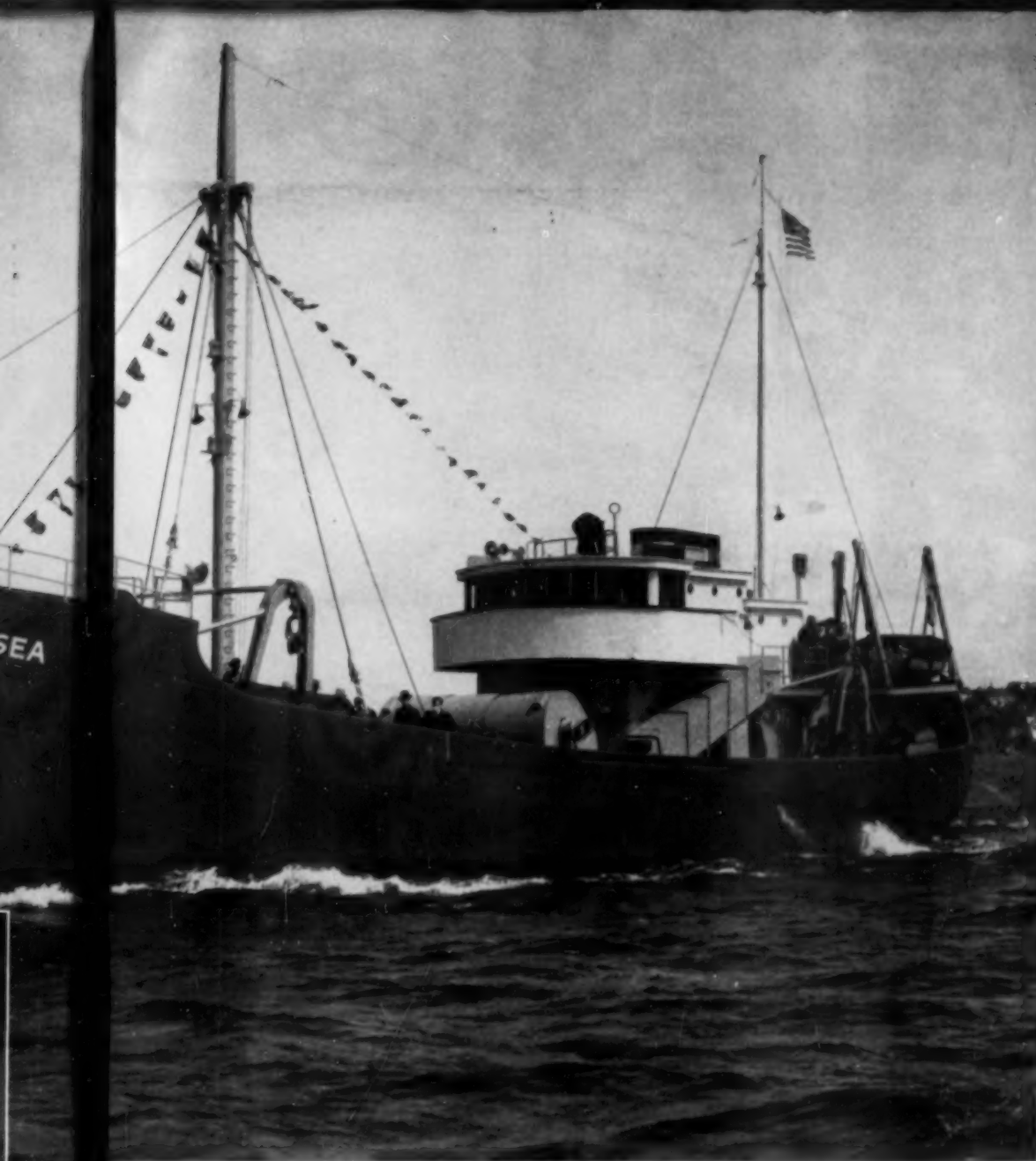
Torque converters offer these advantages in marine

applications: (1) harmful, costly engine lugging and stalling are eliminated; (2) with torque converter drive, engines work in the maximum efficiency range at all times, delivering constant high-horsepower output; (3) power is automatically matched to the load demand, with gear-shifting minimized or eliminated; (4) heavy load pick-up is smooth, even, without clutch-slippage; (5) overloads, shock loads, vibrations and torsional variations are cushioned out, through fluid connection, which means longer life and less maintenance on engines, transmissions, clutches, drive line components and driven equipment; (6) torque converter drive provides an infinite variety of ratios with which to work, permitting smooth, accurate control of the load and delicate inching or holding under power.

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Close-up of powerful diesel engine torque converter combination which has increased line pull from 5 to 15-tons, and has at least doubled hoisting speed on the *Duncan-Harrelson No. 10*, a derrick barge. Engine is a Cat D-337 diesel and Converter is Twin Disc.





The *Deep Sea* catches, processes and packs fish at sea. Trawl winch has a Twin Disc three-stage torque converter on its GM 100 hp diesel, for maintaining constant line pull with any throttle setting. Converter also allows the output shaft on the winch engine to slow or speed automatically as the ship rolls.

As any trawler fisherman knows, one of the most painful headaches in this type operation is engine lugging and stalling while pulling the net. As the boat lifts in heavy seas, there is a terrific strain on the power unit. With mechanical drive, the only solution is oversize engines. On the *Brighton*, however, the Irving Usen Trawling Co., of Boston, has solved the problem completely by installing a Twin Disc three-stage torque converter behind a Buda 75 hp diesel. In determining the most efficient, most economical means of powering this trawling winch, the company contemplated the use of an electric motor. But the excessive cost for both the motor and a special winch led to installation of the powerful diesel engine torque converter combination. Today, the strains and shock loads from the roll of the boat, the pull of the sea, and the weight of the catch are all automatically and smoothly overcome through the converter.

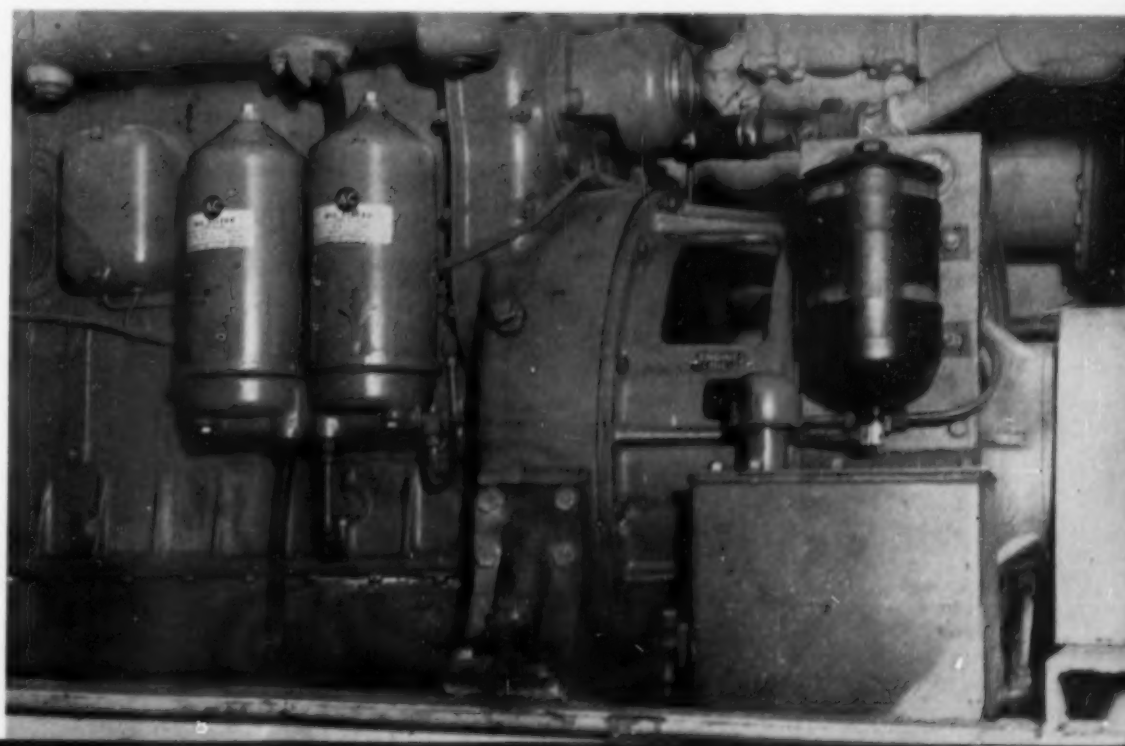
On one of the earliest installations, the *Deep Sea*, an interesting item of deck gear is the enclosed

rawl winch. It is claimed to be one of the largest winches ever built, as well as one of the most powerful. It has two trawl drums, each capable of handling 600 fathoms of $\frac{3}{4}$ in. cable and two cargo drums, each designed for 30 fathoms of $\frac{3}{4}$ in. cable. Power for the winch is supplied by a 100 hp GM diesel, driving through a Twin Disc three-stage torque converter. With converter drive, the operator can control line pull by varying the engine throttle setting. With any setting, the converter will maintain a constant line pull. The output shaft of the torque converter automatically speeds up or slows down as the ship rolls, so as to maintain constant line tension. To increase or decrease the line pull, the operator simply changes the throttle setting.

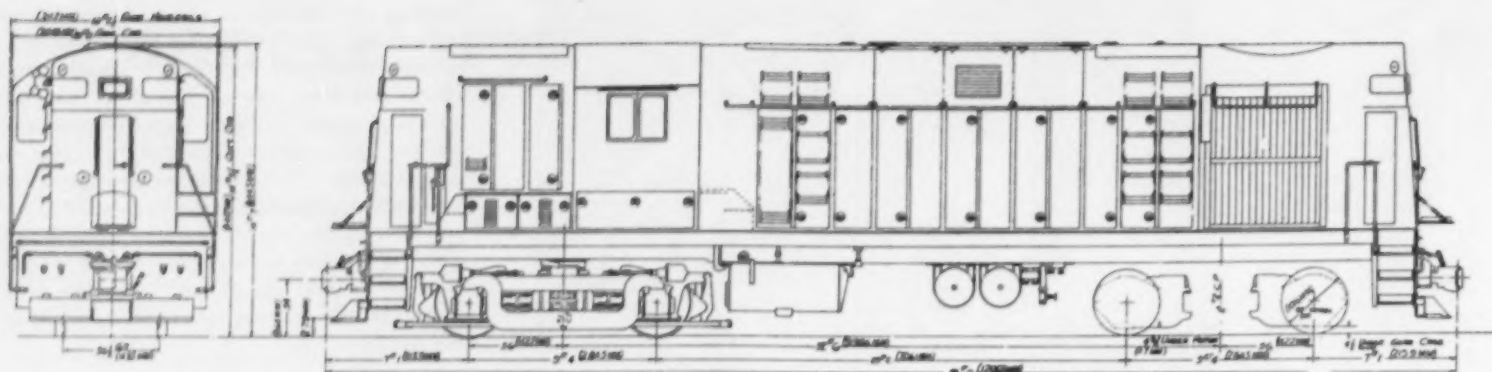
In cable laying operations, the Pacific Telephone and Telegraph Co. modernized what is now its busiest cable barge—by converting it from steam to diesel. The *Telephone II*, operating in Puget Sound waters, drives through a Model CRR-11500 series Twin Disc torque converter to smoothly and efficiently transmit power from a GM 6-110 diesel driving the cable reel. The combination of the torque converter and the GM diesel provides steam-smoothness with diesel safety and economy. The 15 ft, 200-ton reel handles $4\frac{1}{2}$ in. to 5 in. cable with ease at maximum speed of 4 mph at approximately 20,000 lbs line pull.

An old-time marine construction firm, the Duncanson-Harrelson Co., Richmond, Calif., recently contracted to build the Richardson Bay Bridge, a unit of Highway 101 between Sausalito and San Rafael. This was a joint venture with the Pacific Bridge Co., San Francisco, and the operation called for the lifting of 270 pre-cast, pre-stressed concrete girders, each 80 ft long, and each weighing over 40 tons. To meet the greatly increased load demands of the *Duncanson-Harrelson No. 10*, the barge was re-powered. A Caterpillar D-337, 170 continuous hp diesel engine, equipped with a Series 10000 Twin Disc torque converter was installed. Results of repowering and adding the torque converter are; line pull has been increased from 5 to 15-tons, and hoisting speed has been more than doubled.

Close-up of the Twin Disc Torque Converter which transmits power from the 100 hp General Motors diesel engine on the trawler *Deep Sea*.



locomotive outline — model UD18B



GENERAL ELECTRIC EXPORT LOCOMOTIVES

By DOUGLAS SHEARING

A UNIVERSAL line of nine diesel-electric locomotives that can be used on almost any railroad in the world is being built by the General Electric Company. According to Guy W. Wilson, General Manager of GE's Locomotive and Car Equipment Department, the new line is designed to meet the current overseas motive power revolution by standardizing diesel-electric locomotives.

"The market for which the GE universal locomo-



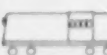






tives will compete is rich in potential," Mr. Wilson said. "Railroads overseas today stand where U.S. railroads stood 20 years ago except that there are more steamers to be replaced, and the railroads are not as well developed."

There are still more than 100,000 steam locomotives in operation in countries outside the U.S. Any of the nine GE diesel-electrics can be used for switching, freight, or passenger service and can be

built for wide variety of gages. All are proportioned to meet the restricted clearances encountered aboard and can be adopted to all types of couplings and braking systems.

The nine locomotives include five horsepower sizes: 400, 600, 990, 1320 and 1980. They produce a range of maximum speeds from 60 to 90 mph and continuous tractive efforts from 26,500 pounds to 53,000 pounds. The 990, 1320, and 1980-horse-

A Glance at the New Universal Locomotives

OUTLINE									
MODEL	U4B*	U6B*	U9B	U9C*	U12B	U12C*	U18B	UD18B	U18C*
Diesel engine, gross horsepower	400	600	990	990	1320	1320	1980	1980	1980
Wheel arrangement	B-B	B-B	B-B	C-C	B-B	C-C	B-B	B-B	C-C
Total weight, fully loaded	104,000 lb.	108,000 lb.	150,000 lb.	173,000 lb.	157,000 lb.	179,000 lb.	211,000 lb.	240,000 lb.	206,000 lb.
Weight per axle, fully loaded	26,000 lb.	27,000 lb.	37,500 lb.	28,833 lb.	39,250 lb.	29,667 lb.	52,750 lb.	60,000 lb.	34,333 lb.
Locomotive speed at maximum motor rpm	60 mph	60 mph	86 mph	86 mph	86 mph	86 mph	92 mph	92 mph	86 mph
Diesel engine	D375	D397	FW-6	FW-6	FV-8	FV-8	FV-12	FV-12	FV-12
Traction generator	GT-595	GT-595	GT-577	GT-577	GT-581	GT-581	GT-581	GT-581	GT-581
Traction motors	GE-761	GE-761	GE-761	GE-761	GE-761	GE-761	GE-752	GE-752	GE-761
G-E specification no.	4666	4667	2076	2078	2077	2079	2080	4487B	2081
*Models available for 36-inch gage applications, using GE-764 traction motors.									

power locomotives can be built with two-axle trucks or, when lighter axle-loading is required because of track and roadbed conditions, with three-axle trucks. The 400 and 600 horsepower locomotives will both use the same chassis and the 990 and 1320 horsepower locomotives will be built on the same chassis.

GE engineers expect a floating bolster suspension system which is used throughout the universal line to reduce maintenance costs because it should reduce vibration. This suspension system employs a truck bolster mounted on rubber pads to permit lateral motion of the truck. Fully equalized and floating on rubber, the locomotive will receive less jar and strain, with minimum stress on tracks.

Truck maintenance cost should be reduced and maintenance procedure simplified by the elimination of the numerous complicated, and often inaccessible, support members of the conventional lateral-motion truck. Despite an increasing activity of locomotive building in other countries, the United States is the leading builder of locomotives for the world market.

Diesels Used in GE Universal Models

U9B, U9C—990 hp 1000 rpm Cooper Bessemer, Model FW-6, turbocharged, 6-cylinder in line.

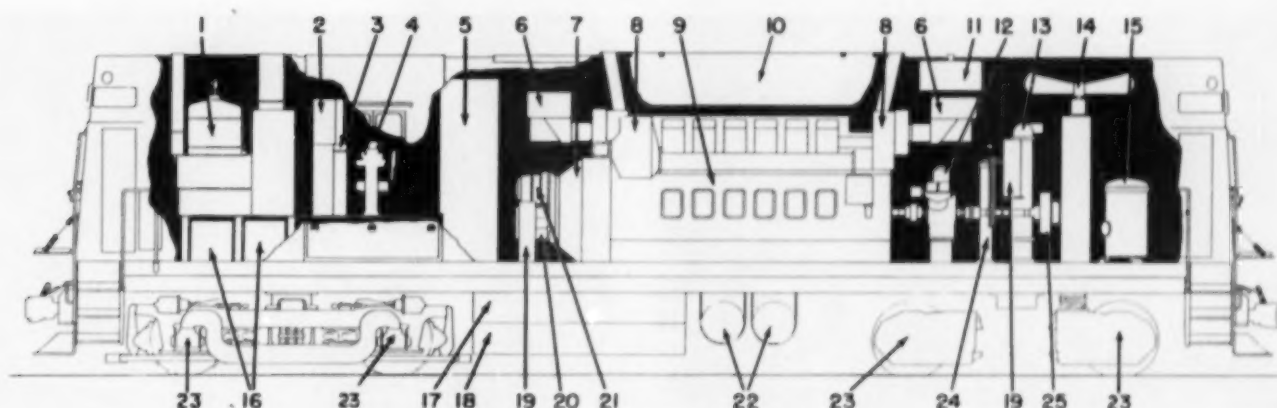
U4B—400 hp 1300 rpm Caterpillar, Model D-375, turbocharged, 8-cylinder, V-type.

U12B, U12C—1320 hp 1000 rpm Cooper Bessemer,

Model FV-8, turbocharged, 8-cylinder, V-type.
U6B—600 hp 1300 rpm Caterpillar, Model D-397, turbocharged, 12-cylinder, V-type.
UD18B, U18B, U18C—1980 hp 1000 rpm Cooper Bessemer, Model FV-12, turbocharged, 12-cylinder, V-type.

Each of the GE universal locomotives has a coded model number which indicates its horsepower classification and the number of axles. Thus, U4B denotes a universal locomotive, 400 horsepower, with four axles. The other model numbers are U6B, U9B, U9C, U12B, UD18B, and U18C. Other specifications of the line are shown in the chart accompanying this article.

location of apparatus



- | | | |
|-------------------------------|---|--------------------------------|
| 1. TRAIN-HEAT STEAM GENERATOR | 10. DYNAMIC-BRAKING RESISTORS | 19. TRACTION-MOTOR BLOWERS |
| 2. INSTRUMENT PANEL | 11. ENGINE-WATER-COOLING EXPANSION TANK | 20. BATTERY-CHARGING GENERATOR |
| 3. OPERATING LEVER | 12. AIR COMPRESSOR | 21. TRACTION-GENERATOR EXCITER |
| 4. AIR-BRAKE VALVES | 13. OIL COOLER | 22. AIR RESERVOIR |
| 5. CONTROL COMPARTMENT | 14. RADIATOR FAN | 23. TRACTION MOTORS |
| 6. ENGINE AIR FILTER | 15. LUBRICATING-OIL FILTER | 24. LUBRICATING-OIL STRAINER |
| 7. TRACTION GENERATOR | 16. BATTERIES | 25. EDDY-CURRENT CLUTCH |
| 8. TURBOSUPERCHARGER | 17. FUEL TANK | |
| 9. DIESEL ENGINE | 18. WATER TANK FOR TRAIN-HEAT STEAM GENERATOR | |

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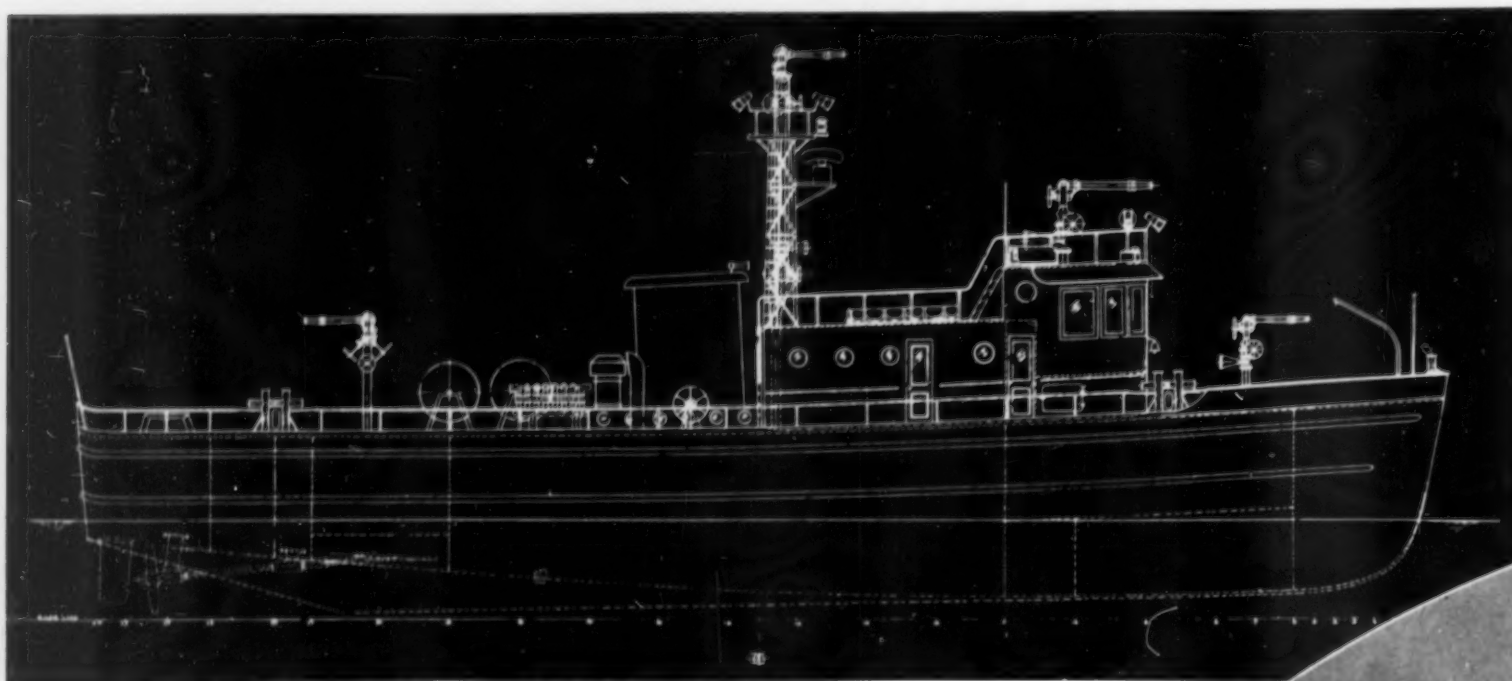
BALTIMORE'S NEW FIREBOAT

**Mayor Thomas D'Alesandro Jr. Has Four
Fairbanks-Morse Diesels, Two F-M Pumps,
Can Throw 12,000 gpm While Moving
At Full Speed of 17 mph.**

BASED on performance tests, the City of Baltimore's new fireboat, the *Mayor Thomas D'Alesandro Jr.*, rates as one of the nation's most notable pieces of fire-fighting equipment. The vessel has exhibited unusual maneuverability, speed, power and pumping capacity, all achieved at a very low price. The 103 ft fireboat was designed by Thomas D. Bowes, noted naval architect and engineer of Philadelphia, and built in the Camden, N.J., yards of the RTC Shipbuilding Corp. Powered by a pair of 660 hp Fairbanks-Morse diesels, the twin-screw vessel ran a measured mile at 17 statute mph, sailing smoothly and completely without vibration even at full speed.

An important feature of the new boat is her ability to maneuver at full speed, utilize full power to tow a burning or disabled ship, and at the same time to deliver full volume of water to fight the fire. This is accomplished by providing a separate pair of diesels to drive the Fairbanks-Morse fire pumps, allowing the boat to project 12,000 gallons of water per minute under any conditions. Maneuverability is vital to successful service for a fireboat and the *Mayor Thomas D'Alesandro Jr.* handles as easily at full speed as a small motor boat. On test, the vessel turned at full speed in a circle just $1\frac{1}{2}$ times her length and made a crash reverse in less than two lengths.

The ever-growing tonnage handled through the World Port of Baltimore has made it increasingly important to provide the harbor with the best type of fireboat protection available. Baltimore had not added to its waterfront fireboat fleet since 1921 and was placing dependence in four aging vessels: the dieselized *Cascade*, a World War I submarine chaser obtained from the Navy in 1921, and three old steam fireboats, the *Cataract* built in 1891 and rebuilt in 1914, the *Deluge* put in service in 1911, and the *Torrent* built in 1921. Under Baltimore's progressive Mayor Thomas D'Alesandro Jr., the city's Board of Fire Commissioners was authorized to provide a fast, modern fireboat to



Looking forward in the engine room the two Fairbanks-Morse propulsion engines are in the foreground and the pumping engines behind them. This view shows the Snow-Nabstedt reverse-reduction gears and the multiple-unit Air-Maze intake air filters. Part of the foam unit can be seen front and center.



give Baltimore's bustling harbor the finest fire protection possible. At the direction of Board President W. F. Hilgenberg, a survey of harbor requirements was made by Baltimore's able Fire Chief Michael H. Lotz and Thomas D. Bowes, M.E., naval architect who has designed so many of the nation's modern diesel fireboats. The survey indicated that the new boat should be capable of covering as much waterfront as any two of the old fireboats and the following characteristics were decided upon:

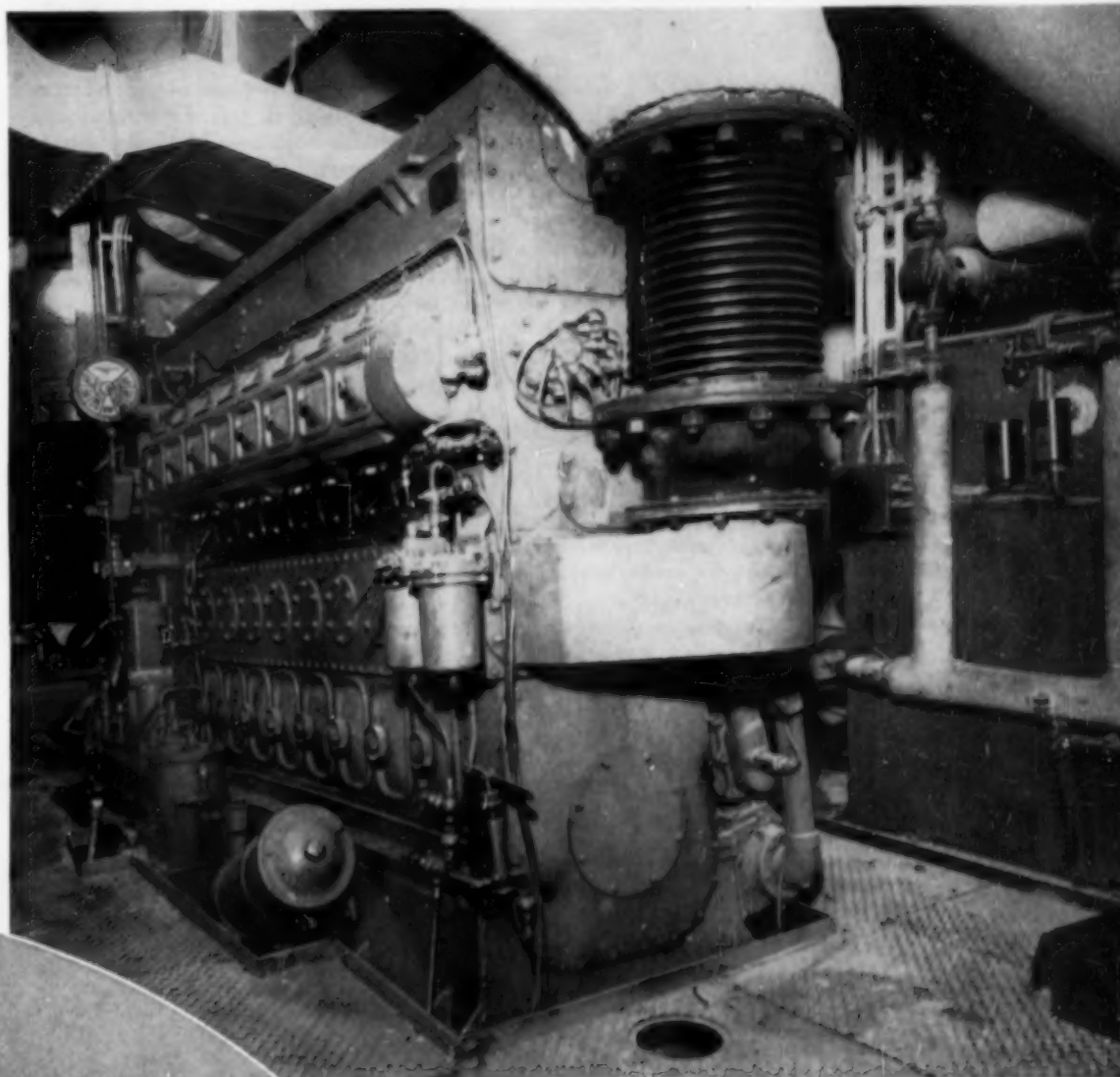
Type:	Twin screw diesel fireboat
Construction:	All welded steel
Classification:	American Bureau of Shipping
Fire-Fighting Characteristics:	National Board of Fire Underwriters
Length Over All:	103 ft 8 in.
Length between Perpendiculars:	100 ft 0 in.
Beam Molded:	21 ft 8½ in.
Depth Molded:	11 ft 11½ in.
Draft:	7 ft 8 in.
Water Capacity:	12,000 gpm @ 150 psi.
Foam Capacity:	320,000 gal. in 20 min.
Speed:	16 statute mph
Propulsion bhp.:	1320 bhp @ 1200 rpm.
Pumping Engines:	Two 660 bhp or a total of 1320 bhp @ 1200 rpm.

A study was then made to determine the best form to provide the desired speed and also provide exceptional maneuvering characteristics. After

One of the two Fairbanks-Morse opposed-piston propulsion engines which drive the new Baltimore fireboat through the water at 17 mph. This 660 hp diesel is a smaller version of the engine used to power U. S. submarines, ice-breakers and other vessels. This is the port engine looking aft. Purolator Filters can be seen on engine.

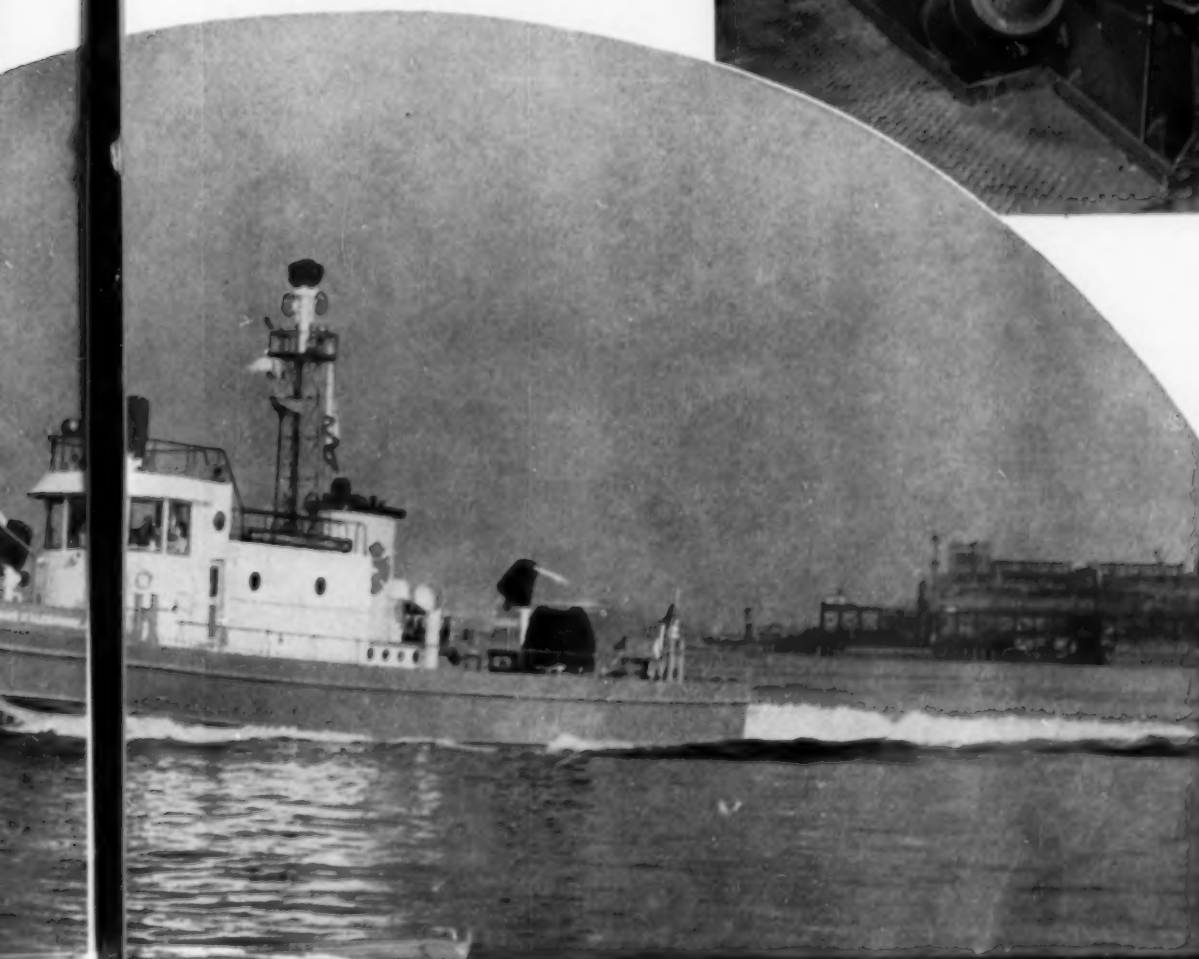
lines were completed, arrangements were made with Professor Louis A. Baier of the University of Michigan to tow a model in their experimental model basin. This model experiment indicated that it should be possible to achieve a speed of 17 mph if displacement could be held down to 175 tons. The success of the design and the accuracy of engineering calculation were proven in the recent trials on the Delaware River when the completed fireboat churned across the measured mile at exactly 17 mph.

It was an achievement to provide heavy-duty propulsion engines of the required power plus additional engines for independent pump service and still keep weight down to the level that would permit the desired speed. This was accomplished by using the Fairbanks-Morse Model 38F5¼ opposed-piston diesel, a smaller version of the OP that earned its reputation for sea power on submarines, ice breakers and work boats. Four identical engines were used on the new fireboat, each with 8 cylinders, 5¼-in. bore and 7¼-in. stroke.



rated at 660 hp at 1200 rpm. These heavy-duty power packages have strong but light frames of welded steel and have virtually all accessory equipment built in or mounted on the engine. Included are Purolator fuel and by-pass lube filters, Air-Maze intake air filter-silencers and full-flow lube filters, Kewanee-Ross oil coolers and heat exchangers, F.M. cooling water pumps and Woodward governors. Total combined weight of all four diesels, including mounted accessory equipment and the reverse-reduction gears on the propulsion engines, is just about 31 tons. This represents 2,640 horsepower.

Another important weight saving was achieved by having the big valves for the fireboat's water lines specially fabricated of stainless steel. The weight of cast valves would have been prohibitive and would have made it impossible to attain the desired speed. The two propulsion engines drive



four-blade bronze Ferguson propellers through Snow-Nabstedt reverse-reduction gears with a ratio of 3.79 to 1. There are dual Westinghouse Air Brake engine controls in the pilot house and the man at the wheel has instant control of the vessel's power. On the trials, the boat went from full speed to a crash stop in 16 seconds (stopping in less than two lengths). The engines were delivering full power astern in just 7 seconds.

The exceptional maneuverability of the fireboat is attributable in large measure to the special-type twin rudder operated by a standard C. H. Wheeler electro-hydraulic, rapon slide steering gear. The gear is powered by a variable and reversible piston-type pump, servo-controlled and operated through a full follow-up differential storage motion control. An important feature of the Wheeler steering gear is that it provides automatic and instantaneous hand steering in the event of electric power failure. As we have indicated, the combination of special rudder and steering gear make it possible to handle the fireboat with the ease of a small speedboat and on trials, the vessel made turns at full speed in a circle $1\frac{1}{2}$ times her length. Fire-fighting potential for all-weather, round-the-clock service is enhanced by RCA radar and Motorola ship-to-shore telephone. The fireboat has to get to the fire fast and maneuver effectively, but the big job, of course is to throw streams of water and extinguish the blaze. The *Mayor Thomas D'Alesandro Jr.* has large, unvarying capacity and elaborate means of delivering the water where and when it is needed.

Heart of the fire-fighting system is a pair of 10 in. Fairbanks-Morse horizontal split-case centrifu-

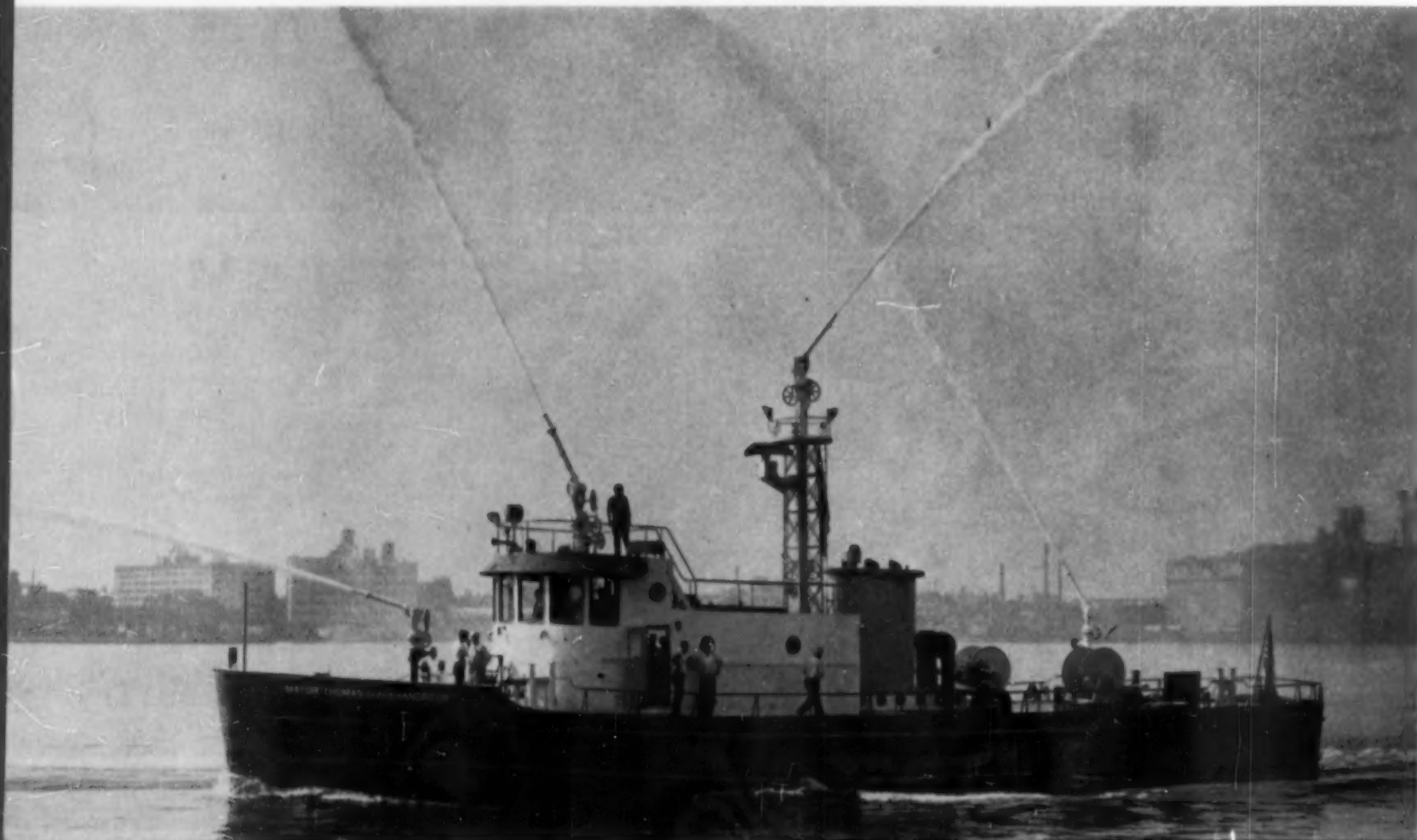
gal fire pumps, each rated at 6,250 gallons per minute at a discharge pressure of 150 lbs. Each pump is driven by its 660-hp F-M diesel at 1200 rpm through an Airflex coupling-clutch. Together the two pumps provide to monitors and hoses an assured volume of 12,000 gpm whether the boat is standing beside a dock or moving with full speed and propulsion power. Water is delivered at 150 lb pressure to four big fire monitors: one forward, one aft, one on top of the pilot house, and one on a tower rising 20 ft above the deck house roof (28 ft above the main deck). In addition, a special type manifold was provided on deck with swivel ells and valves for ten $3\frac{1}{2}$ -in. hoses. With this manifold design, it is possible to run all the hoses off the bow, stern, port or starboard side of the ship without looping the hose. When it is not necessary to run $3\frac{1}{2}$ in. hoses ashore for the fireboat to act as a pumping station Siamese fittings can be provided on each of the $3\frac{1}{2}$ -in. swivel ells so that 20 smaller hose lines can be taken ashore. The fire pumps are so piped that it is possible to put them in series so that pressure can be raised to 300 psi at reduced quantity. This feature was desirable so that the fireboat could pump into the shore high pressure fire main. In addition to the water capacity of the ship (the equivalent of a dozen big land pumpers), it is possible for her to project 320,000 gal. of foam a distance of 120 ft in 20 minutes. A special system was designed for this fireboat to make foam handling fully automatic. This is accomplished with a special Fairbanks-Morse rotary pump which projects the right amount of foam liquid into the water, depending entirely on the flow of water. The system is also arranged with a portable link between the water valve and the foam valve on each of the four hy-

drants just forward of the pilot house. By disconnecting the links and leaving the foam valves closed, it is possible to use four $2\frac{1}{2}$ in. hose lines from the same hydrants.

With all the power and fire-fighting equipment, the designer found plenty of room for quarters for 8 men (with a complete washroom) in the forecabin and for a ninth man in the deck house. In addition to the roomy pilot house, a large combination lounge, galley and mess room was provided for the crew in the deck house, with an electric refrigerator, electric stove, sink, drinking fountain and other equipment. The lounge has not only transom seats but also very comfortable arm chairs. Provision of quarters for the crew has economic significance since the vessel is to be manned 24 hours a day and the previous shore fire station can now be eliminated. The new fireboat will replace the old steamer *Torrent* and important savings will be realized by eliminating the oil burned just to keep the *Torrent's* boilers hot and ready to answer a call. With the diesels, the engines can be started in seconds and don't use a drop of fuel until they are called on to go to work. All in all, Fire Department officials estimate that savings will pay the entire cost of the new fireboat in just a very short seven years.

The delivery price of the completed fireboat, ready to go into operation in Baltimore harbor, was approximately \$550,000, one of the lowest costs per gallon of projected water of any modern fireboat. The combination of ingenious engineering and fine equipment must be credited for the outstanding performance and economy of the fireboat *Thomas D'Alesandro, Jr.*

Baltimore's new fireboat, the *Mayor Thomas D'Alesandro, Jr.*, surges along at 17 mph while shooting 12,000 gallons of water per minute through her monitors. This view shows the vessel during trials at Camden, N.J.



NEW MARINE GEAR

By ARNOLD B. NEWELL

HAMDEN, Connecticut—For the past several months I have been watching the tests on a new marine reverse-reduction gear designed and built by the 50-year-old Snow-Nabstedt Gear Corporation of this New Haven suburb. As a matter of fact engineering and development of the unit started some five years ago and is only now being publicly announced as S-N Model 3971.

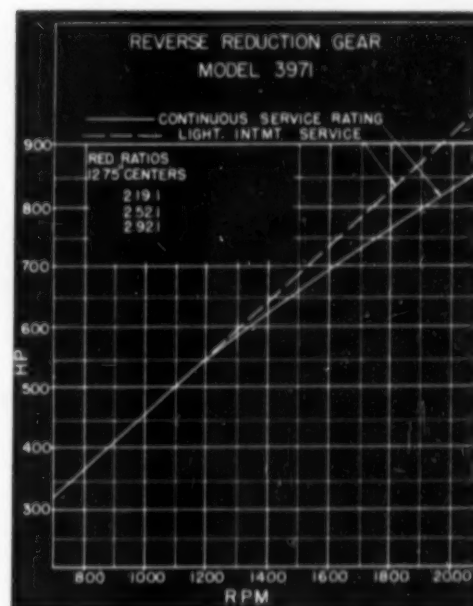
The salient feature in the order of importance as I see them are: (1) Reverse and reduction gear employs one housing. Various reduction ratios are available with the same housing. (2) Operation of the propeller in either direction of rotation continuously with equal efficiency. Therefore two identical engines can drive two propellers, one right hand and one left hand in twin screw arrangement. Another example would be a ferryboat with a propeller at each end driving half the time in one direction and the other half the time in the opposite direction. (3) Hydraulic operation of the clutches thus eliminating mechanical devices for this purpose. (4) Easy accessibility to the gears. (5) Provision for the removal and overhaul of accessory equipment without opening the gear case. (6) Ability to operate up to 2000 rpm.

The principle of operation is shown in the accompanying schematic drawing which, of course does not include the housing. Referring to this drawing, it is apparent that all of the gears are constantly in mesh and continuously rotating. The

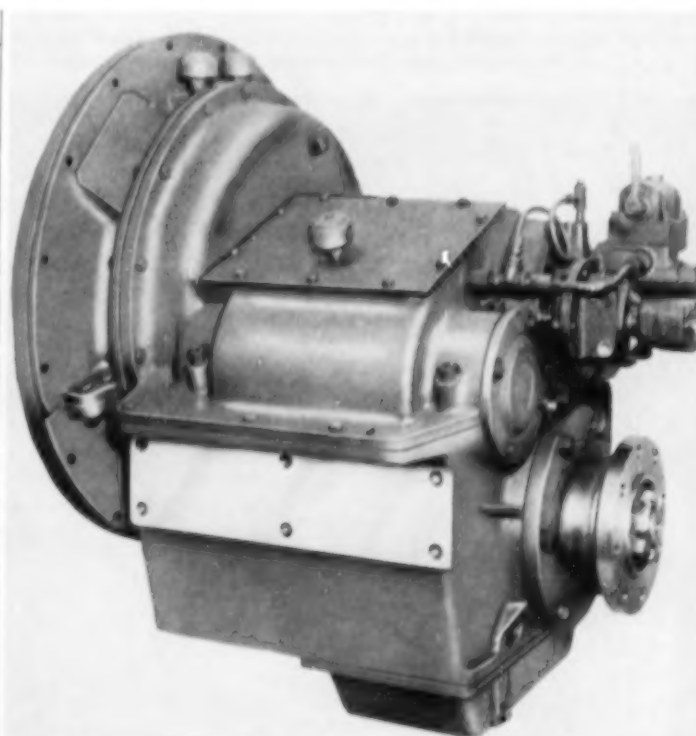
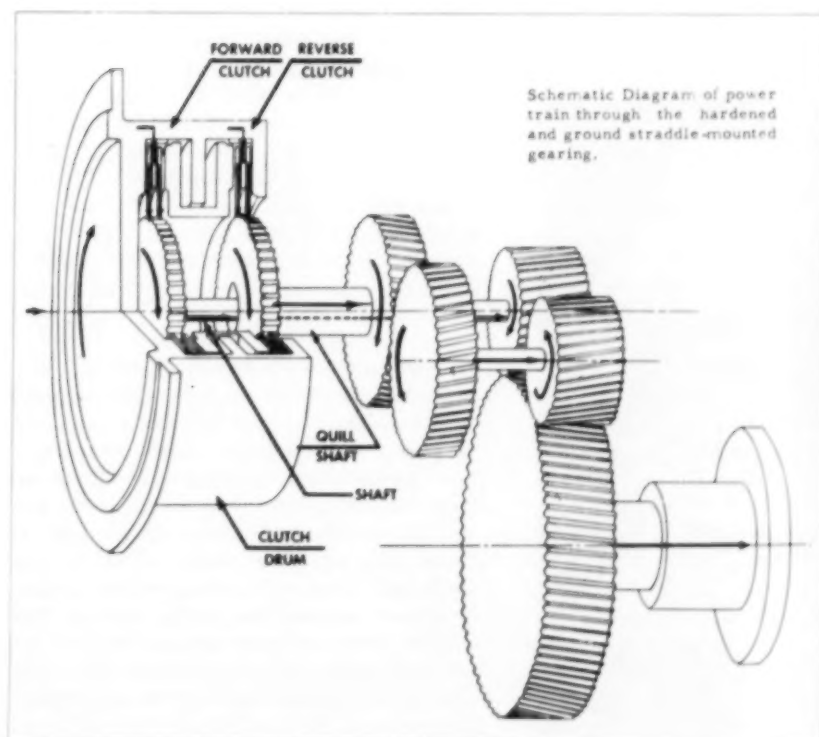
clutches are engaged by hydraulic pressure maintained by an external pump. Oil is carried through rifle drilled passages leading through the shaft and other elements to the annular space between the clutches which is divided as shown and oil tight between the ahead and the astern chambers.

In neutral position oil pressure is equal on both sides of the engaging element and the sintered clutch faces have ample clearance to prevent drag. When one clutch is engaged the running clearance in the other becomes double the neutral clearance. It is impossible to engage both clutches at the same time. The greater clearance between discs in the disengaged clutch gives additional assurance that there will be no drag. It should be noted that these are wet clutches and the annular spaces between them are constantly filled with oil under pressure thus eliminating a time interval required to build up pressure. Consequently response is instantaneous when the control valve admits pressure to one side of the selector.

All of the working elements run in an oil bath which strikes the gears in spray form. The oil level in the sump is below the gears. Any oil leakage from the clutch compartment falls to the bottom of the housing and drains to the sump. All of the oil is passed through a fine strainer and cooler ahead of the pump. Therefore the 125 psi hydraulic pressure in the system is not applied to cooler and strainer. It is not necessary to take the model 3971 apart to attach it to the engine. Once installed it need not be detached from the engine to remove gears above the bull gear. This accessibility is made possible with a diagonally split housing from which the top can be removed very easily. The bearers on the engine bedplate remain doweled in place and initial alignment remains undisturbed if it becomes necessary to remove the gears. All accessories are separately removable from the outside of the housing at the rear end. Adaption is SAE 00 or 0 flywheel housing.



Weight has been reduced about $\frac{1}{3}$ compared to the older models of similar capacity. It is 2400 lb. The length is 8 in. less than the earlier model similarly rated. The model currently in production is offered with gear reduction ratios of 2.19:1, 2.52:1, 2.92:1 and during the first quarter of 1957 ratios up to 5.00:1 will become available. Structurally, the model 3971 has a cast iron housing, with aluminum available at the option of the customer. The gears are hardened and ground, straddle mounted between anti friction bearings and the synchronized clutches which automatically release each other in order to minimize clutch drag. Overall mechanical efficiency is better than 96 per cent. This high efficiency is due in large measure to the use of anti friction bearings throughout. For different places there are different makes of anti friction bearings. Some are SKF, some are Hyatt and others are Timken.





WHAT'S GOING ON IN ENGLAND

CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C., Ltd., Southall, following which he served some five years with that company's sales engineering department. He entered technical journalism as assistant editor of "Gas & Oil Power" in 1950 and was appointed editor in 1952.

Meadows New Automotive Diesels

THE first of the Autumn exhibitions in England at which new diesel designs inevitably make their appearance is the Commercial Motor Show held in late September at Earls Court, London. Advance news releases indicate that once again a number of manufacturers will introduce new models and one company, Henry Meadows, Ltd., of Wolverhampton, has already released details of no less than four new designs which they will be offering for road transport applications. In England today, as indeed in most industrialized nations, the trend in automotive diesel design is towards increased power from more compact designs and British engine designers, moreover, are faced with the added complications of planning engines for vehicles that must comply with rigid legal requirements so far as overall physical size and weight are concerned.

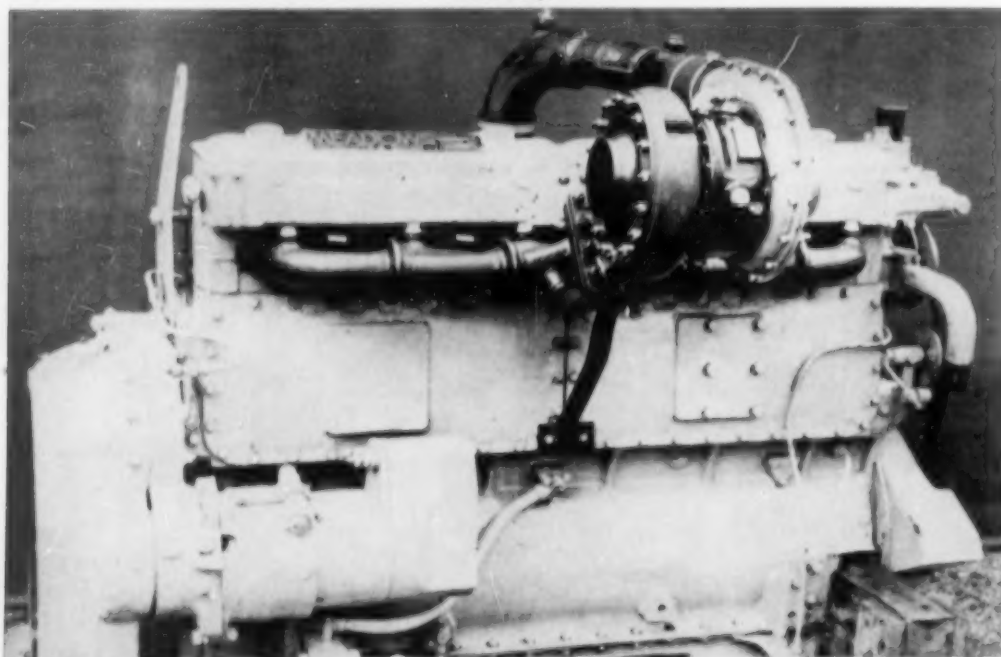
Space occupied by an engine is wasted space so far as the earning capacity of a vehicle is concerned, and hence, the desire for greater power from smaller engines grows. British designers, moreover, are resorting more and more to putting the

engine out of the way by horizontal underfloor location. These facts have had a marked influence on the four new Meadows designs now announced, the most interesting of which is a turbo-pressure-charged six-cylinder unit rated at 185 bhp at 1,900 rpm. It is known as their model 6DCS630 and is based on a normally-aspirated engine of similar type which has been in production at Wolverhampton for some years past. In its un-blown form, the engine is rated at 130 bhp, which means that turbocharging results in an increase in power of 42% at a price increase which, I understand, is only of the order of 20%.

When Meadows first started developing pressure-charged diesels, they felt that, as the main use for the unit would be automotive, the best line of development would be to concentrate on positively-driven blowers of the Roots type. The results of this development work proved that the additional power could only be obtained at the expense of increased specific fuel consumption and consequently higher operating costs. For the past two years, therefore, Meadows have concentrated

development towards obtaining the required automotive torque characteristics from a turbocharged unit and this has been made possible by employing a high-speed low-inertia turbocharger designed and manufactured in Germany by the Eberspacher company. This small German blower will shortly be marketed in England and is of simple design. It is water cooled and consists of an inward flow turbine and centrifugal compressor. Ball bearings are used throughout and the lubrication system is self-contained. Meadows plan to operate a replacement scheme for the blower whereby the complete unit is exchanged after approximately 30,000 miles of operation for a very low cost. Divided exhaust manifolds carry the blower, which is mounted directly on the exhaust inlet flange. The air from the compressor is directed across the top of the engine and enters the common air manifold in the center, thus ensuring an even air distribution to all cylinders. The 6DCS630 has a common bore and stroke of 130 mm. (5 1/8 in.) which gives a swept volume for six cylinders of 10.35 litres (633 cu in.), the maximum torque occurs at 1,300 rpm, the figure being 540 lbs ft.

Meadows 6DCS630 automotive diesel 6 cylinder vertical engine developing a max. of 185 hp at 1900 rpm. Turbocharger on this engine is made by Eberspacher Co. in Germany.



The second new design announced by Meadows has the same bore and stroke as the turbo-charged unit already described and is of the same physical size (i. e. six cylinders, 10.35 litres) but it is normally-aspirated and of the horizontal type for underfloor mounting. Its rating is the same as the original vertical design upon which it is based, namely 130 bhp at 1,900 rpm and it provides a torque of 420 lbs ft at 1,000 rpm. Fuel consumption is given as .390 lbs per bhp per hr at maximum power.

The remaining two new engines are physically similar to each other so far as their main running components are concerned, but here again, one is for vertical and one is for horizontal mounting. These are known respectively as types 6DC500 and 6HDC500 and each has six cylinders of 120 mm. bore by 120 mm. stroke. They are rated at 135 bhp at 2,400 rpm, with a torque of 346 lbs ft at 1,400 rpm. These two new engines are virtually six-cylinder versions of an earlier Meadows four-cylinder design and their introduction, with the other two larger engines mentioned above, provides vehicle builders with a much wider choice of Meadows power units.

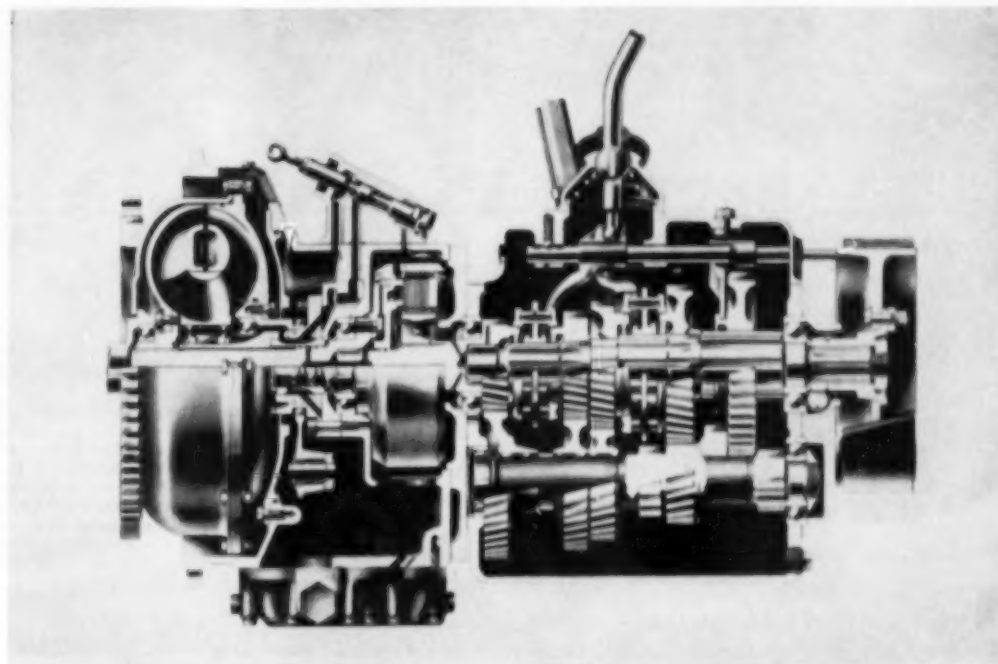
POWER TRAIN FOR DIESELS

In Jackson, Michigan, the Clark Equipment Company Transmission Division has produced a new power train for off highway and stop-and-go operation to be used with diesels in various types of construction equipment, buses, and other vehicles requiring frequent stops and starts and numerous shiftings of gears. It is called the TransVerter and is a hydraulically actuated combination of three standard elements designed and manufactured by Clark. These elements are a torque converter, a multiple disc type clutch engaged hydraulically by a spool type clutch control valve mounted on the top of the torque converter housing, and a five speed helical gear transmission. This gear transmission is available in synchronized and non-synchronized models and a four-speed non-synchronized model also is available.

The operational advantages of this new packaged power train include elimination of engine stalling; sharp reduction of gear shifting to the point where most work can be performed in the same gear; and fine inching control by simply working the throttle. Provision is made for SAE power-take-off attachments to be driven by the torque converter. The unit has a rating of 325 ft lbs and is delivered ready for mounting with any standard engine. It is only eight in. longer than a conventional transmission and clutch and can be installed by the original equipment manufacturer without a major change in design of the line.

With a hydraulic type of disconnect instead of the conventional heavy friction clutch troubles resulting from left foot fatigue are eliminated. The clutch is an on-off type that need not be let in or eased. Consequently any number of clutch releases can be employed, including shift lever, button or conventional type of pedal raised slightly from the floor board. The torque converter in the TransVerter is a single stage, three element type designed and built by Clark with a 2.57:1 maximum torque multiplication ratio. It is equipped with an over running clutch in the stator so that the converter performs as a hydraulic coupling under light load conditions and can therefore operate at high efficiency through the load range.

All converter elements are single piece aluminum castings mounted on anti friction bearings of high capacity. There is ample cooling capacity to prevent over heating under severe loading. Oil passages $\frac{1}{2}$ in. in diameter are about twice the diameter provided in automotive torque converters. It rotates in a dry housing thus eliminating oil leak problems at the flywheel housing. Because of minimum sump requirements, the torque converter is almost even with the bottom of the transmission making maximum road clearance possible.



Cutaway view of the Clark TransVerter transmission combination showing from left to right; torque converter, hydraulic disconnect clutch, and five speed helical gear transmission.

The torque converter has a coupling gear type drive and can be fitted to any engine equipped with SAE housing and a suitable flywheel. The adapter plate which joins the torque converter housing to the transmission case is another flexibility factor of importance. It permits the converter to be used with a variety of Clark transmissions without having to change the converter housing on the unit.

The disconnect clutch is hydraulically actuated of the multiple disc type. When hydraulic pressure is applied to the clutch, a piston forces the two sets of plates together. This, in effect, couples the torque converter output shaft to the main drive gear of the transmission. As a result, torque is transmitted from the engine through the converter to the transmission and finally out to the drive shaft. When hydraulic pressure is released the clutch plates separate, immediately disconnecting the engine drive from the transmission so gear shifting is easy. Hydraulic pressure to the disconnect clutch is controlled by means of the clutch control valve—a simple, hydraulically balanced spool type valve. It is mounted on top of the torque converter housing for accessibility and easy maintenance. When the valve is in on position, oil pressure is applied to the clutch pack and in the off position oil drains back rapidly to the torque converter sump. The connect-disconnect action is quick and positive and no creeping occurs.

The clutch can be engaged at idling speed because the TransVerter is equipped with a torque converter. Slippage takes place in the converter rather than in the clutch. Because it is not a power absorbing member the clutch is reported to have an almost indefinite life. In normal operations, a TransVerter equipped unit could be started in second gear. Third and fifth would be the other

commonly used ranges. Once the working speed is selected, the transmission might be left in that gear for the whole operation. The low or first gear would only be needed for emergency torque requirements and creeping.

An oil circuit completely separate from the transmission is provided for the torque converter and hydraulic disconnect clutch. Installation of the TransVerter is thereby greatly simplified. There are only two connections for the entire hydraulic circuit; one oil line for the cooler and another from the cooler. The externally mounted oil pump provides hydraulic pressure for the converter and disconnect clutch. It is driven directly by a gear train from the input side of the torque converter. Since the latter is tied to the engine flywheel, the hydraulic pump is in operation whenever the engine is running and there is hydraulic pressure with the engine idling. The oil sump and screen serve the converter and clutch. The oil pump can be detached for servicing by simply removing four bolts. The sump is easily removed. The pressure regulating valves, one for the converter and one for the clutch, are located at the bottom of the sump housing readily accessible for servicing, by merely removing a plug without disturbing anything else. The hydraulic circuit uses four gallons of Type "A" hydraulic fluid.

Clark-built transmission, coupled with the heavy-duty converter and hydraulic disconnect clutch units, are available in the TransVerter power train in the following types: 4 speeds forward—one reverse, or 4 speeds forward—4 speeds reverse; 5 speeds forward—one reverse, or 5 speeds forward—5 speeds reverse with 2nd, 3rd, 4th and 5th speeds synchronized; 5 speeds forward and one reverse in a non-synchronized version. All are available with SAE No. 3 bell housing.



GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

FEW realize there are probably more application possibilities for the gas turbine than for any other type of prime mover. The fuel ranges from gases to solids. Metals used depend upon the temperature of the gases into the turbine, this ranges from 900° F of the Houdry Process units up to 1600° F and more in certain jet installations. Temperature is one of the factors determining efficiency and efficiency is an important consideration when determining application and economic value. We normally match the efficiency of a unit with the price of fuel consumed in order to assist us to determine its economic value. Table No. 1 may be of help in determining how efficient a unit you need to operate based on the price of fuel available. Obviously we would like to operate the most efficient type of unit with the cheapest fuel but this generally cannot be done. If it is done the cost of maintenance may increase greater than the saving in fuel. In the gas turbine field many power plants are specially built to burn a specific type of low grade fuel.

The following is a brief review of the applications pertaining to the efficiencies in Table No. 1: Class 1, 40-32% Efficiency: This is the class of the turbocharged diesel engine including the later types of 2 cycle diesels not turbocharged. Normally these engines burn diesel oil, however for certain applications as heavy stationary or marine engines up to 10,000 hp, they will burn a heavy oil. These engines operate about 100 rpm and where weight is a disadvantage as in marine the gas turbine can be used to advantage in some cases burning the same heavy oil, in other cases burning a cheaper grade. However, these gas turbines will not operate at the high diesel engine efficiency.

Class 2, 34-28% Efficiency: This group includes aviation turbojets and turboprops operating at high altitude; also certain turbocharged spark ignition engines, mostly in the aviation field which operate at a fine efficiency at low altitudes. It is now generally accepted that the free piston engine (whose exhaust gases drive a turbine) comes into this class whether it be of the automotive, marine or stationary type. The larger the bore the easier it is to burn a heavier oil.

Class 3, 30-24% Efficiency: This is still a high efficiency group and we find many of the old time

diesels in this. Large stationary and marine open cycle gas turbines may fall within this class. The *John Sergeant* Liberty ship which has a General Electric 6000 shp open cycle gas turbine is a good example of this class. It not only has a large regenerator to improve its efficiency but when operating at sea, the entire steam supply is furnished by the heat of the exhaust gases. The small gas turbine of a few hundred hp does not come into this group even with a regenerator attached to it except in special cases. The majority of aviation's jet units come into this class, again when flying in the cold air region at altitude.

Class 4, 24-20% Efficiency: This is the class of the modern automobile with its present high compression engine or a suitable gas turbine with regenerator which Ford, General Motors and Chrysler have already demonstrated on test. This group covers practically all gas turbines with regenerators or heat exchangers except the more efficient ones listed in Classes 2 and 3. This class includes the bulk of the gas turbine units burning low grade inexpensive fuels for practically all applications, especially stationary and marine installations.

Class 5, 20-12% Efficiency: This class takes the bulk of the early gas turbines built without regenerators or any other fuel saving device. It will also continue to expand for many applications where light weight is extremely necessary together with a very simple type of power plant. The Boeing Airplane Company have built over 500 small light

weight units of this simple type. This power plant has only 3 elements, the compressor, the combustor and the turbine; either a single shaft turbine for power plant use or a split shaft turbine for variable load as a pumping station or automotive propulsion. It is an ideal class for the coal burning gas turbine, especially as a locomotive or stationary plant in the coal regions, where the high cost of transporting coal is negligible. The same is true in the oil and gas fields. The simple type of turbine is often justified with cheap fuel.

In conclusion it is of interest to note that the *Gas Turbine Progress Report* published in 1952 by the American Society of Mechanical Engineers listed approximately 200 large gas turbine units of all types (not counting aviation) in service or on order throughout the world. Recently, *Power* magazine published a comprehensive table covering the details of 400 large stationary gas turbines in service or on order. These 400 stationary turbines amount to twice as many turbines as there were listed only 4 years ago covering all types. 50% or 200 of these units are on this side of the Atlantic including Canada and the countries to the south of us. Many are located in the oil regions of Venezuela and Canada where Brown Boveri have sold 13 units ranging from 20,000 to 30,000 kw and many smaller ones. The Creole Petroleum Corp. of Venezuela alone have purchased 23 units from General Electric and Westinghouse, mostly ranging from 5000 to 8000 hp. Each of these applications have a definite economic advantage.

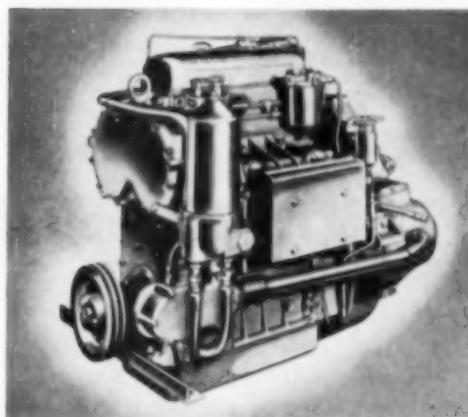
TABLE I
Efficiency vs Fuel Cost

Class	% Efficiency of Power Plant at Full Load	% Cost Fuel	Fuel Cost* Cents Per Gallon
1	40-32	100-80	10 -8
2	34-28	85-70	8.5-7
3	30-24	75-60	7.5-6
4	24-20	60-50	6 -5
5	20-12	50-30	5 -3

*If you are now operating a modern diesel in Class 1 and paying 10¢ per gallon for fuel and wish to change to a gas turbine in Class 4 you would have to pay less than 6¢ per gallon to maintain the same fuel cost. You would no doubt not make this change. However, if you need a new power unit in your plant and can get fuel for 4¢ per gallon that will burn well in a Class 4 gas turbine then turbine fuel costs become competitive with diesel fuel costs.

Marine Models Announced

Two new diesel propulsion units especially adapted for installation in small boats have been announced by the Detroit Diesel Engine Division of General Motors. The new models are three- and four-cylinder Series 71 engines offered for the first time without heat exchangers and with through-shaft, direct-drive marine gears as standard equipment. Various types of heat exchangers can be used on these models and they are, therefore, especially adapted for use in boats where cooling systems are already installed. The standard direct-drive gears offer maximum compactness for small-boat installations. Compact reverse and reduction gears are also available as options in ratios of 1.5:1, 2:1 and 2.5:1.



This is the compact three cylinder unit in the 71 series developing 110 shp.

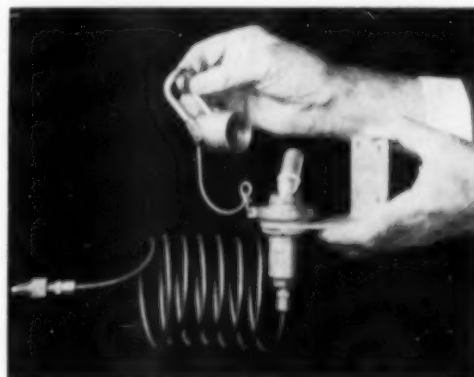
Standard models weigh 1580 and 1850 lbs, develop 110 and 151 shaft hp, respectively, and are available as matched pairs in both right- and left-hand engine rotation. The larger model is offered with both cast iron and aluminum block. In the latter aluminum is used also in other component parts for further weight reductions. All models have thermostatic engine water control. Models continue to be available complete with heat exchangers or facilities for keel cooling and with General Motors hydraulic reverse and reduction gears. The new models, however, offer increased flexibility in the selection of these accessories. Complete specifications can be obtained from Detroit Diesel marine distributors and dealers or by writing the Detroit Diesel Engine Division, General Motors Corporation, Detroit 28, Michigan.

Cold Engine Starter

A pressure primer system for combustion engines insures quick starting in sub-zero conditions. Designed for convenient dashboard mounting of the rugged waterproof discharger unit, the Chevron Pressure Primer System provides for quick, easy starting of all types of internal combustion engines at temperatures as low as 50° below zero. This unit eliminates the need for heated storage, overnight idling, or pre-heating of engines. It also saves batteries and ends the need for extra men when starting engines.

A simple press of a lever on the discharger shoots a fine spray of Chevron Priming Fuel directly into the engine air intake, resulting in quick, sure, cold starting with good priming fuel economy. No hand pumping is necessary even in very low temperatures. The highly flammable Chevron Priming Fuel is safely packaged in strong steel cartridges

which makes reloading of the discharger as simple as reloading a soda-siphon bottle. Design of the cartridge is such, however, that it cannot be mistakenly used in place of carbon dioxide filled cartridges. One cartridge, costing only a few cents, is generally enough to start any engine, though in extremely cold temperatures or with large engines



additional cartridges are needed to keep the engine running until the regular fuel takes over.

For installation, a hole is tapped below the air cleaner on diesels or above the carburetor in the air horn or air cleaner on gasoline engines. The injector nozzle is screwed into this hole and connected with tubing to the discharger, and the unit is ready for operation. The Chevron Pressure Primer System is Coast Guard approved for use on small boats and aboard ship and complies with current military specifications for engine starting aids. It is available through any of the following companies: Standard Oil Company of California, 225 Bush St., San Francisco 20, California; California Oil Company, 1200 State Street, Perth Amboy, New Jersey; California Company, U. S. National Bank Building, P. O. Box 780, Denver, Colorado; Standard Oil Company of British Columbia, Marine Building, Vancouver, B. C.; Standard Oil Company of Texas, P. O. Box 862, El Paso, Texas.

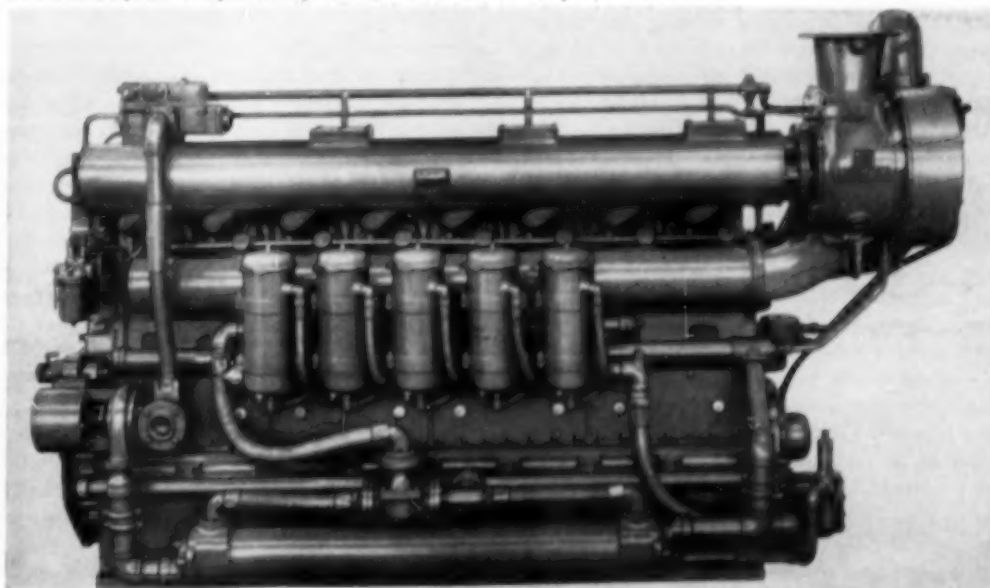
New White Industrial Diesels

An improved series of industrial diesel engines which can operate exclusively on low-cost fuel has been developed in ratings to 1,025 hp. These Model 40 Superior diesel engines, available naturally aspirated or supercharged, are being produced by White Diesel Engine Division of the White Motor Company. They are designed for use in heavy equipment like power shovels, as standby power for industrial plants and telephone companies and mobile power for utilities. Portable engine generator sets range to 600 kw capacity. The new heavy-duty models are built as four-cycle, six or eight cylinder, vertical, in-line engines. Output of the engines ranges from 215 to 1,025 hp. The latter represents nearly a 50 per cent increase over a top capacity of 700 hp in the previous line. Yet the new supercharged engines are the same size as the previous models.

Design features of the new models include: 1. Improved open chamber combustion which assures better fuel economy. Redesigned intake and exhaust ports induce ideal swirl for best mixing of air with fuel. 2. Dual fuel operation on 100 per cent fuel oil, or natural gas with pilot fuel injection for ignition. Gas from sewage plants also can be used. 3. Cold weather, heavy duty compressed

air starting system eliminates need for storage batteries, airmotors or auxiliary starting engines. 4. Cylinder block design simplifies servicing and enables even major overhauls to be made on the spot. 5. Individual cylinder heads are removable and interchangeable, easily handled by one man. 6. Same size engines despite higher efficiency and greater horsepower output in supercharged models

because engine is designed to take full advantage of turbocharging. 7. Rigid, box-type base fully supports crankshaft and eliminates strains of swung-type crankshaft. 8. Constant, full pressure lubricating system with increased pump capacity and improved pump drive. 9. Improved two-valve cylinder heads reduce the number of parts and simplify construction.





AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY MERRILL C. HORINE

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

Diesels Must Breathe

Two Part Article

Part II

MODERN automotive engines also have an overlap of valve opening and closing at top center. The intake valve is opened somewhat ahead of center and the exhaust valve is closed a few degrees after. This does not result in blow-back through the intake, largely because of the inertia of the air in the intake passages and because the last portion of the exhaust closing, like the first portion of the intake opening affords only a minute opening. What this does accomplish is somewhat the same effect as a steeper ramp on each cam at this index; but without the mechanical shock which such a contour would produce. If the engine ran infinitely slow, this would not be necessary and the full expansion ratio of the engine could be utilized; but the greater the engine speed, the earlier the exhaust opening must be. It must not be thought that this reduces the power by allowing too much of the pressure to escape prematurely, robbing the piston of power. The exhaust lag, at the design speed is such that effective pressure on piston persists down to bottom of expansion stroke.

It is the extent of exhaust opening lead and intake opening tardiness, in connection with other effects, which determines the torque characteristic of the engine. In slow-speed engines the exhaust does not open as early or the intake close as late as in high-speed engines. By adaptation of valve timing the designer can locate the torque, M.E.P. and economy peaks wherever he wishes in the operating speed range. If he chooses a low-speed peak, then he will have an engine with good lugging ability, but limited maximum speed and moderate specific horsepower. If he chooses a high peaking speed, then he will have higher maximum speed and greater specific horsepower, but deficient lugging ability. If he seeks high specific horsepower and a lightweight engine he is obliged to time his valves for a torque peak at high rpm. But valve timing is not the only determinant of volumetric efficiency. It is obvious that the larger the area of valve clear opening, the less the resistance to air flow and hence the greater the amount

of air which the engine can take in. Merely increasing the lift of a given size of valve will increase its clear opening; but there are definite mechanical limitations on valve lift. These limiting factors are the ability of the cams and lifters to withstand the shock and stress which increase with lift. Much attention has been devoted to the matter of increasing the stamina and endurance of valve lifters, to enable higher lifts to be employed. Encouraging results have been secured with mushroom lifters, hard-faced with inlays of tungsten-carbide, hydrogen-copper brazed.

FACTORS OF VOLUMETRIC EFFICIENCY

Valve Port Area
Valve Lift
Valve Seat Angle
Valve Timing
Combustion Chamber Form
Air Cleaner Restriction
Intake Manifold Restriction
Exhaust Manifold Restriction
Muffler Restriction

With flatter seats, the same amount of lift on the same port diameter will increase the clear opening; but it is difficult to keep flat valves flat and therefore properly seated. Many designers have been successful, however, with 30-degree face angles in preference to the conventional 45 and others have gone as flat as 20 degrees. Obviously an increase in valve diameter will effect a marked increase in clear opening; but here again there are stubborn limitations, since the larger the valve diameter, the more difficult it is to cool the valve head stem. Larger valves are heavier, require stronger springs, which, like increased lift, impose increased mechanical stresses on valve gear—particularly the lifters.

Another way to increase valve opening area is to double up on the valves. Two small valves may afford the same area as one large one. If each is independently actuated, the inertia forces on the

mechanism will be diminished, at the cost of doubled complication. If the two valves are operated by the same lifter, pushrod and rocker-arm, on the other hand, the mechanical load will be increased over that of a single valve of equal clearance area. Cooling two small valves can be easier than one large one; but adequate jacketing about them—particularly with a central injector to care for, presents a problem. Necessity for breathing capacity induces designers to resort to dual valves.

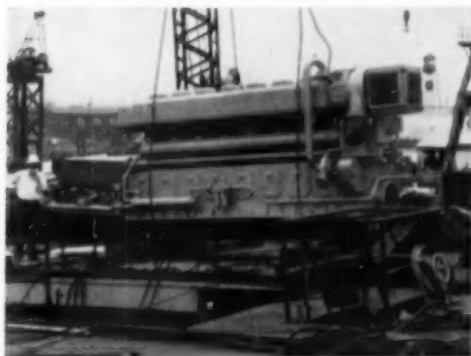
Other influences affecting volumetric efficiency are the degree of cooling of the passages through which the air must pass before entering the cylinder—particularly within the head itself—and the area of hot wall to which it is exposed. Obviously the cooler the air entering the cylinder the denser it will be, so that more pounds of air will enter the cylinder in the same volume. For this reason, progressive designers endeavor to make the intake passages in the head as short as possible and porting of the exhaust and intake on opposite sides of the head is preferred. Modern automotive diesel applications have the air cleaner arranged to take in air from outside the hood, or the air cleaner itself located outside. This insures cooler air in the beginning. Diesels are fortunate in that they do not require a choked-down venturi, as necessary in a gasoline engine carburetor, nor are their designers confronted with the necessity of maintaining high air velocity in the manifold. Consequently large intake manifolds, with easy bends at their laterals and with no exchange of heat with the exhaust manifold for vaporization, permit free flow of air.

So far we have considered only the naturally-aspirated four-stroke type of engine. The same principles apply to the two-stroke engine, albeit different methods of controlling the admission of intake air and in some cases of exhaust than when poppet valves are used. Volumetric efficiency equivalent to that attainable in the four-stroke cycle can be obtained provided sufficient blower capacity is supplied, involving, of course a not inconsider-

able consumption of power by the blower. Supercharging has for its object, an increase in volumetric efficiency, beyond that which is possible with natural aspiration; but it cannot compensate for shortcomings in the basic design of the engine. Its effectiveness will be in proportion to the volumetric efficiency of the engine without supercharging. For maximum efficiency, the engine, whether supercharged or naturally aspirated, must have the counterpart of large nostrils, clear sinuses and good chest expansion.

Even the air cleaner can affect the volumetric efficiency of an engine, for whatever restriction it offers serves to reduce the amount of air which can be aspirated. In like manner the exhaust manifold, the exhaust pipe and muffler can reduce the amount of pure air available to the engine in proportion to their restriction and consequent incompleteness of scavenging of exhaust gases resulting. Combustion chamber form and its relation to the position of the valves have an important bearing upon the breathing capacity of the engine. Obviously, the simpler and more symmetrical its form and the more directly the valves open into it, the less restriction the combustion chamber will offer to both the inflow of air and the outflow of spent gas. This accounts in part for the rise to predominance of the various open-chamber designs today. Fundamentally, as has often been said before, an engine is a pump. The better pump it is, the better engine it is.

Diesel for Ferryboat



The above photograph shows a Union diesel as it was being installed in the new ferry *Carquinez*.

The State of California, Division of Highways ferry *Carquinez* was sponsored by Mrs. Goodwin J. Knight, wife of the governor, when launched recently. This double ended ferry boat is powered by a direct reversible 1000 hp Model P8 supercharged Union diesel marine engine. It has eight cylinders, a 12 in. bore and 15 in. stroke, and delivers rated power at 485 rpm. Each line shaft includes a thrust bearing of the pivoted segmental type, also manufactured by Union Diesel. Pneumatically powered controls provide maneuvering directly from each of the two pilothouses. Conventional manual controls are retained in the engine room and may be used whenever desired.

The *Carquinez* is 180 ft long with a beam of 68 ft. It is intended to accommodate forty automobiles plus fifty foot passengers. She will operate at the foot of the Delta Region after the Sacramento and San Joaquin Rivers have joined between Mar-

tinez and Benicia, California, some 25 miles east of San Francisco.

Anderson-O'Brien Open House

On September 21, 1956, Anderson-O'Brien Company, California Distributors of General Motors Diesel Engines, held an open house at their Main Plant, 746 E. Washington Blvd., Los Angeles, California, and were hosts to about 325 of their customers and other friends. The grounds were flood-lighted to enable inspection of various units displayed out-of-doors. The guests were a good cross section of the construction, transportation and petroleum industries, with quite a few from County, State and Federal Government facilities.

Several pieces of equipment were on display in operation including GM's new turbocharged diesel and the new 6-110 series with Roots type blower. Among generator sets displayed were a 150 kw for delivery to Morrison-Knudsen and a 200 kw for delivery to Isbell Construction Company. Anderson-O'Brien Company's new Seco dual circuit system of engine cooling was demonstrated and received much favorable comment from various Operators and Engineers as the features and advantages in stabilized cooling and improved combustion were explained. It was demonstrated that constant temperatures, better combustion and clean exhaust could be maintained at all loads and speeds from idle-no-load to full speed-full load, and that a heavier grade of fuel could thus be utilized.



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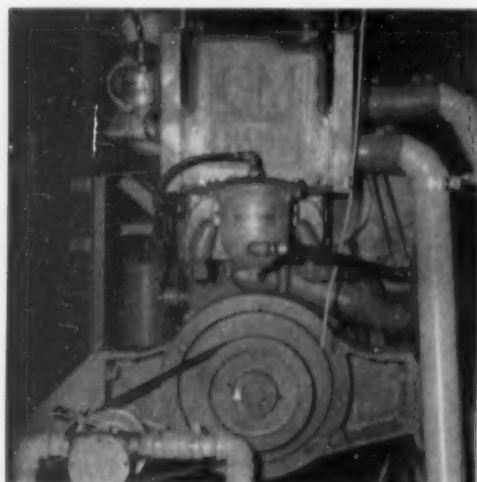
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Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
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Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario
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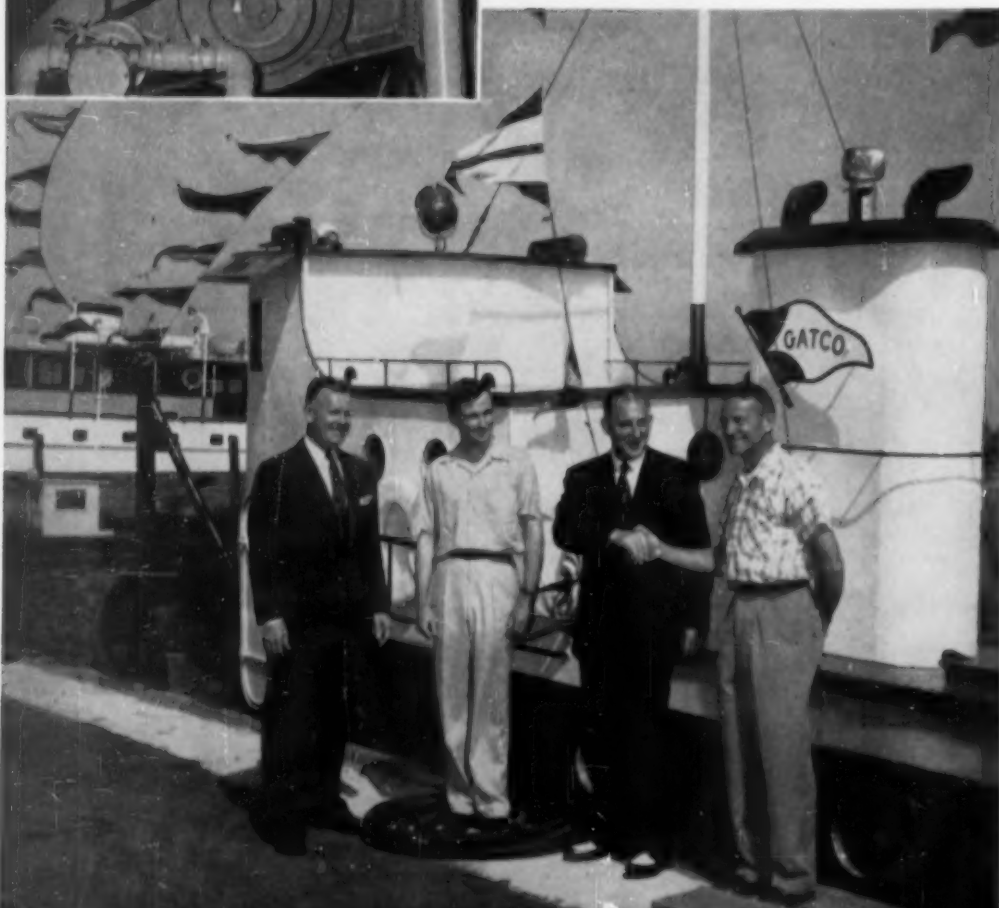
A.P. 174-817



▲ The new red, white and green tug, *Gatco Georgia* built by Diesel Shipbuilding Co. on Pablo Creek near Jacksonville, Fla.



◀ One of General Motors 6-110 diesels in the engine room of the tug *Gatco Georgia*. Note Perry cooling water filter.



GATCO GEORGIA

By ED DENNIS

NAMED for the State of Georgia, the *Gatco Georgia*, was recently launched at the yards of the Diesel Shipbuilding Co. near Jacksonville, Florida for the Gulf Atlantic Towing Corp. General dimensions of the new *Gatco Georgia* are length overall 56 ft 4 in., beam 15 ft, and a draft of 6 ft 6 in. Hull and superstructure are of all steel construction with shell and bottom plate of $\frac{3}{8}$ in. steel, the bulkheading and deck are of $\frac{1}{4}$ in. steel. For the deck-housing $\frac{5}{8}$ in. steel plate was used with $\frac{3}{8}$ in. x $2\frac{1}{2}$ in. flat bar steel for the framing on this new tug.

Harold G. Williams, president of Gulf Atlantic Towing Corp., said that the *Gatco Georgia* will be put into service along with a new 195 ft specially designed universal barge called *Dumbo* hauling gum rosin and turpentine from Georgia to New Jersey, which to his knowledge will be the first time gum rosin has been shipped in bulk by barge. The new tug and barge will load gum rosin at Brunswick, Ga. and discharge it at Fieldsboro, New Jersey during the summer months. During the winter season they will transport turpentine, using the Intercoastal Waterway through the year. On the return trip, this tug-barge combination will haul steel products on the deck down the waterway to Jacksonville, Florida.

Dumbo, the barge, is a typical liquid carrier except that the pumps are below the after deck and all valves are depressed allowing a smooth deck surface. This unique tug-barge combination will carry an average cargo of 350,000 gallons of gum rosin or 500,000 gallons of turpentine per trip, returning South with 1700 tons of steel.

Propulsion is provided by a General Motors diesel engine, tandem twin model 6-110 developing a continuous horsepower of 440. Electric power is provided by a 3 kw, 32 volt Onan diesel generating unit plus an engine mounted 1500 watt, 32 volt main generator. A $1\frac{1}{4}$ inch Jabsco main bilge pump with a clutch is also driven off the main engine. The Onan diesel engine also supplies power for a Jabsco auxiliary bilge pump.

All quarters including the Captain's room, pilot house, galley and crew's quarters are heated by an automatically fired Way-Wolff hot water heating boiler. Fuel capacity is 5,200 gallons plus 120 gallons of lubricating oil and 800 gallons of fresh water. Gulf Atlantic Towing Corp. will now have a fleet consisting of 18 tugs and 25 barges for coastal and harbor use.

L to R; L. C. Ringhaver, president, Diesel Shipbuilding Co., J. W. Coppedge, asst. treasurer of the firm, H. G. Williams, president of Gatco, Winston Owens, general manager of Diesel Shipbuilding Co.

Appointed General Sales Manager



Charles A. Shenberger

The appointment of Charles A. Shenberger as General Sales Manager of Erie Forge & Steel Corporation, Erie, Pa. has been announced. Mr. Shenberger is a steel industry veteran with broad experience in sales and sales management. His employment began in 1939 with A. B. Farquhar Company, York, Pennsylvania. From 1945 to 1953, he served successively as sales representative, manager of industrial sales and manager of sales for the Standard Steel Works Division of Baldwin-Lima-Hamilton Corporation. In 1953, Mr. Shenberger became product sales manager and later Indianapolis Plant sales manager of the Heppenstall Company, Pittsburgh, Pennsylvania.

In his new capacity at Erie Forge & Steel Corporation he will direct the sales of forgings and steel castings produced for a wide diversity of industry. Mr. Shenberger, a native of York, Pennsylvania, is a graduate of York Collegiate Institute.

Morse Chain Appointments



Stanley J. Roush



Robert O. Bass

The election of Stanley J. Roush to the newly created position of Group Vice-President of Borg-Warner has been announced by Roy C. Ingersoll, Chairman of the Board. Several divisions of the corporation will report directly to Mr. Roush.

Mr. Roush also will retain his present positions as President of the Atkins Saw Division of Borg-Warner and President of Morse Chain Company, a subsidiary of Borg-Warner. Mr. Roush was President of the Kerotest Manufacturing Company prior to joining Borg-Warner in September 1952.

Mr. Roush also announced the election of Robert O. Bass, President of the Eberhardt-Denver Company of Denver, Colorado, to be Executive Vice-President and Assistant General Manager of Morse Chain Company. Bass will headquarter at Ithaca, New York, and will be responsible for their operations at Ithaca, New York; Detroit, Michigan, and Simcoe, Ontario. He will also continue as President of the Eberhardt-Denver Company of Denver, Colorado. Robert Bass was associated with Fred Eberhardt, the founder of the Eberhardt-Denver Company, in building it to be a recognized leader in the speed reducer and power transmission field. Eberhardt-Denver Company was purchased by Morse Chain, a Borg-Warner Company, in February, 1956. Robert Bass graduated in 1941 from the University of Denver with a B.S. in Business Administration.

Sea Water Distillation Conference

Choice of materials for evaporator construction to effectively combat corrosion without sacrificing cost and manufacturing ability, was the main subject of a panel discussion held recently at the Millstone, Connecticut Marine Laboratory of The Maxim Silencer Company of Hartford, Connecticut. The second conference on sea water distillation to be sponsored by Maxim, the meeting was attended by some 100 people, including representatives of the U. S., Canadian and British navies, the U. S. Coast Guard, U. S. Air Force, commercial shipping companies, as well as naval architects and equipment manufacturers.

The morning session included inspection of the

Marine Laboratory, and demonstration of current and experimental Maxim distillation plants. The panel discussion in the afternoon covered subjects related to the suitability of various materials, including fiberglass and plastics and the more conventional nickel, steel, aluminum and bronze alloys, for use in sea water distillation plants.

Members of the panel were Dr. Thomas P. May (moderator), The International Nickel Company; A. W. Tracy, The American Brass Company; V. V. Kendall, U. S. Steel Corp.; J. F. Mason, Jr., The International Nickel Company; W. W. Milne, Carl Beetle Plastics; and Harry W. Fritts, Aluminum Company of America. A full-size, old-fashioned New England Clambake concluded the all-day program.

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"MORLIFE clutch has gone 851 hours without slipping or adjustment."



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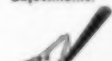
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"Won't buy a unit that isn't equipped with Durable MORLIFE clutch."



EASTERN DIESEL OBSERVATIONS

A COMMENTARY BY ARNOLD B. NEWELL

Arnold B. Newell, a third generation American, was born near Seattle, Washington of pioneer stock. He obtained his engineer's license at 21. Sailed as chief engineer on one of the first ocean-going motorships built in the U.S.A. In 1924 he joined New York Shipbuilding Company in diesel advisory capacity, tested and took to sea New York-Werkspoor diesels, supervised operation of shipyard owned vessels, then in 1927 joined Ingersoll-Rand as diesel field engineer. Became associated with "Motorship" in 1929. Subsequently became managing editor of "Motorship" and "Diesel Power," then vice-president and general manager.

River Improvements

Any one driving along the banks of the Ohio River must be impressed by the magnitude of the work on new dams and locks to better control flood waters and to improve navigation. And, incidentally, the mechanized equipment for this work is largely powered by diesels. The new locks will be large enough to handle complete tows without splitting them thus reducing the time of cargo in transit and freeing towboats and barges to do more work. When boats, barges and cargo valued at several million dollars are delayed, fixed overhead carries on. This includes interest on money tied up in floating equipment and cargo, insurance on boats, barges and cargo and wages.

River improvements are to a large extent destined to reduce such losses and at the same time encourage the building of more powerful diesel propelled towboats to further reduce time in transit while pushing even larger tows. The outlook for the sale of many more diesels of high power is improving in the field of mid-continent navigation.

Turbocharging

The extensive use of turbocharging has revealed an interesting characteristic of the modern diesel. The turbocharger is added to existing diesel models which must thereafter deliver more power than they were designed to produce. A generalization to the effect that the pressures and temperatures do not increase with turbocharging is beside the point; of more significance is the fact that more power is being produced per unit and in this way a reserve of strength, stamina and durability built into the engines originally is being drawn upon with no apparent detrimental effect. The excellence of diesel engine design and construction is being proved by turbocharging.

Reworking the Fields

Some of the biggest markets for dieselized equipment are created by reworking areas that were not thoroughly worked by the earlier more primitive and the more cumbersome methods. Prior to the advent of the diesel in earth moving equipment

one of the most impressive operations of its kind was the reworking of California's old gold fields. One of the earliest diesel applications to this general class of work was to go back over the forest areas of the Northwest and convert small stands of timber into lumber in places inaccessible to the old railroads, steam powered donkey engines, high lines and the big mills fed by such massive equipment. Dieselized trucks and other logging machinery worked the left-over small stands of timber and diesel driven portable saw mills processed the logs for distribution.

Now we are witnessing something of the same sort in the coal mining industry. For example, by the strip mining process about 20% of the anthracite production is carried out in areas where conventional methods do not apply. A similar mining technique is practiced with conspicuous success in the iron mines of Minnesota, in the copper country of Arizona, the uranium mines of New Mexico, the potash mines of Florida and to bring out the Fullers earth and other rare earths on the Pacific Coast. In the more populous areas the best, most powerful earth moving equipment is employed to uncover aggregates used in construction work of all kinds. The reworking of partially worked areas and the invasion of new fields has provided a vast market for diesel engines in strip mining because they are better adapted to this work than any other form of power.

Mass Purchases of Diesels

The city of Indianapolis just announced an appropriation of \$4,000,000.00 to buy 80 new diesel buses to further modernize the street transportation system. Obviously some manufacturer will obtain a handsome order out of this. However, large orders for diesels are not unusual in these days. For example, in talking with an operator of a large fleet of long-haul, open highway trucks in interstate commerce operation, I asked if they had added any new diesel trucks recently and he said they had not. Then he corrected himself and said they had purchased about 40 new ones in the last quarter, but this purchase was not looked upon as new diesel trucks added. They were new and had been purchased as a routine replacement to

maintain the fleet at status quo. When they buy more diesel trucks to increase the size of the fleet it is looked upon as purchasing additional ones. To me this seems to be a distinction without a difference. It represents a typical action in a segment of the diesel market which in its entirety embraces not diesels alone but innumerable accessories essential to the operation of diesels.

Great Lakes Fishing

The commercial fishing fleets on the Great Lakes provided a living for many hard working men, a market for diesel engines, work for some boat builders and delicacies on many tables scattered far and wide. This came to an end when the lamprey eel invaded the domain of the luscious lake trout and a major part of the fishing industry was thereby wiped out. To correct this situation requires cooperative action between the United States and Canada, and the latter government was the first to take the matter seriously. However, concerted effort on the part of the two governments seems to be bringing some results. If and when the process of extermination is completed a resumption of this activity may be expected with corresponding benefit to all concerned.

But first the lakes, especially Lake Michigan and Lake Superior must be restocked, the lake trout must again thrive and multiply, all of which will take time. But time has passed for a dormant industry away from which experienced men may stray. Perhaps the restoration process cannot be hurried in the face of danger of exterminating other species. Time will tell. While this does not represent a very big market for diesels, we believe it is in order to urge that all be done that can be done by our government to restore an enterprise as picturesque as it is important to the appetites of the country as a whole.

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Allis-Chalmers Appointments



W. L. Voegeli



W. J. Klein

W. J. Klein is appointed vice president and director of sales, and W. L. Voegeli is appointed general sales manager, Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis. The three divisions of the Tractor Group are Farm Equipment, Construction Machinery and Buda which manufactures engines and material handling equipment. Klein has been vice president and general sales manager, Tractor Group, while Voegeli has been assistant director of engineering.

Klein was born on a South Dakota farm and started his selling career in 1923. He became affiliated with Allis-Chalmers in 1928, starting as a salesman at the Sioux Falls branch, and was soon advanced to blockman in the northwestern part of South Dakota. In November, 1929, he was made a special factory representative traveling in North and South Dakota and Minnesota. A year later he opened the company's branch at Minneapolis and became its branch manager. He was transferred to the home office as general sales manager, Tractor Division, in 1953 and soon thereafter was made vice president.

Voegeli, who was born on a farm near Wichita, Kansas, started with Allis-Chalmers at the Wichita branch as a serviceman in 1935. He was transferred to Omaha, Neb., branch the same year. He spent several months at Casper, Wyo., handling service requirements on Allis-Chalmers industrial tractors working on Alcova Dam, which at that time was the largest earth-filled dam ever built. He became a member of the home office service department staff in 1936 and was promoted to assistant agricultural service manager in 1939. In 1946 he was made supervisor of the technical publications department, and in January, 1948, he was appointed agricultural tractor sales manager. He held this position until he became assistant director of engineering in November, 1952.

Manufacturing Appointments



David R. Kendell



John L. Wagner

Appointment of David R. Kendell, formerly manufacturing manager for rebuild, as superintendent of manufacturing operations in the new building now under construction at the La Grange plant

of Electro-Motive Division of General Motors, is announced by Richard L. Terrell, Electro-Motive works manager. In his new capacity, Mr. Kendell will be in charge of manufacturing activities in the big 10-acre building, the first part of which is scheduled for completion early this fall. The building eventually will house various sub-assembly operations including manufacture of carbody structures and underframes for General Motors Diesel locomotives and Electro-Mobile Power units for electric utility customers.

Succeeding Mr. Kendell as manufacturing manager, rebuild, is John L. Wagner, who moves to La Grange from Halethorpe, Md., where he has been branch plant superintendent.

Named To Sales Post



H. P. Cardon

H. P. Cardon has been named Assistant General Sales Manager of Kent-Moore Organization, manufacturer of special service tools and equipment. The appointment was announced last week by J. D. Adair, President. Formerly Account Executive, Mr. Cardon will continue with his previous activities along with assisting J. M. Seanor, Director of Sales, in the supervision of all sales functions.

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THE BEST VALUE **MAXIM**
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The best value because Maxim, the pioneer company in silencing, can point to a store of practical experience second to none in the field of noise control... because Maxim can bring to your problems more years of research, engineering and design experience. Whether your silencing application is standard or "special", Maxim can do more for you.

SILENCERS FOR:

- INTERNAL COMBUSTION AND STEAM ENGINE EXHAUST AND INTAKE
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- VACUUM PUMP DISCHARGES
- BLOWER INTAKES AND DISCHARGES
- STEAM, AIR OR GAS DISCHARGES
- JET ENGINE EXHAUST AND INTAKE
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COMPANY _____

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Michigan-Ohio

News

By Jim Brown

R. G. MOELLER Company of Detroit has recently delivered a model 99L Austin-Western power grader to the Kebbee Contracting Co. at Warren, Michigan.

This grader has a UD-14A International Harvester diesel engine.

TAYLOR Brothers Co. of Birmingham, Michigan, are the new owners of a GM 55 kw diesel generator set to power their concrete batching plant. The generator set is wheel-mounted for complete portability and was prepared by Peninsular Diesel Company of Detroit.

MACK Trucks, Inc. through its distributors, Toledo Mack Truck Sales, delivered twenty B61T tractors to Mr. Dale Fought, who is a broker for Kramer Bros. Freight Lines in Detroit. The tractors are equipped with Mack's own END673 Thermodyne diesel engine. The twenty units are used on a shuttle run between Toledo and Everett, Pennsylvania.

A LeTourneau-Westinghouse Model D Tournapull powered by a GM 4-71 diesel was just delivered by the Telford Equipment Company of Detroit to Louis-Garavaglia Co. located in Centerline, Michigan.

THE CITY of Benton Harbor, Michigan, has purchased a new IH TD-14 Crawler Tractor (with hydraulic bulldozer) from Wolverine Tractor & Equipment Company of Detroit and Grand Rapids.

AS a Daffin Feed Mill service shop, Peninsular Diesel has recently replaced an engine in a Daffin feed mill with a GM Detroit model 4031-C diesel for Edem Elevator Company of Edem, Michigan.

THE KENT County Jail of Grand Rapids, Michigan, has purchased a new Cummins generator set (HRCIP-400) from Cummins Diesel Michigan, Inc., of Detroit. The new 55 kw standby generator will be installed in an addition to the jail.

MOHONY & Fraser of Cleveland have accepted delivery of a Galion Model 104 road grader with a 3-71 GM Detroit diesel engine. This engine will be serviced by Great Lakes Diesel of Cleveland, Ohio.

A MODEL 3000 and two Model 2000 Manitowac shovels with Caterpillar diesel engines are going to the Larson Clay Pipe Co. in Urichville, Ohio. The shovels, purchased from the R. G. Moeller Co. of Detroit, will be put into good use on a clay stripping operation. Looks like the clay pipe business is going great guns.

AN HD-21 bulldozer purchased by Mr. Jack Walser of Pontiac, Michigan, from the Earle Equipment Co. of Detroit, is being broken in on the Miracle Mile shopping center off US 10 near Pontiac, Michigan.

CLAIMED to be the world's smallest motor freighter the 85-ft *White Swan* from Petosky, Michigan, is getting an NHRMS-600 Cummins diesel. The purchase was made by Manthei Vencer Mill Company from Cummins Diesel Michigan Inc. in Detroit. The 300 hp Cummins diesel is replacing an older diesel which outweighs the new engine by 6 times. The reverse gear (Capitol) has a ratio of 4 1/2 to 1.

THE EARLE Equipment Company of Detroit has delivered to the Great Lakes Steel Corp. in Detroit an Allis-Chalmers HD-21G (204 hp) Tracto Shovel with a 4-yard bucket.

AN American Locomotive Crane (Model

What makes this hauler a driver's dream?



It's the Allison FourSpeed TORQMATIC DRIVE—a torque converter, transmission and retarder in one compact unit.

And this headline-making drive does more than fulfill a driver's dream as he puts this International Harvester 24-ton Model 95 Payhauler through its paces.

It speeds trips and job-cycle times. There's no break in the power flow as the driver flicks a lever to switch speed ranges with terrain changes. There's no clutch-pedal pushing, no gearshift-guesswork.

Allison TORQMATIC DRIVE holds maintenance and repair

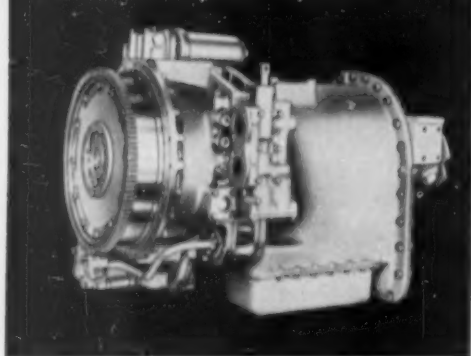
costs down to the minimum. The TORQMATIC converter absorbs shock loads, prevents harmful engine lugging and stalling.

Another exclusive feature of this TORQMATIC DRIVE greatly extends service-brake life, makes driving safer, too. It is the built-in hydraulic retarder which gives this hefty Payhauler a second braking system that saves regular service brakes for full stops or snubbing on curves.

Want to know more about this great new Allison Model CBT-5640 FourSpeed TORQMATIC DRIVE? Write Allison Division of General Motors, Box 894D, Indianapolis 6, Indiana.



Allison FourSpeed Torqmatic Drive



Allison 
TORQMATIC DRIVES

830DE) has been sold to the Detroit Edison Company. The crane's GM 6-71 engine will be serviced by Peninsular Diesel of Detroit.

WOLVERINE Tractor & Equipment Company of Detroit has just delivered a TD-9 Crawler Tractor with a Drott Skid shovel to Mr. Sam Brown Jr. of Detroit, Michigan.

A NEW type of diesel pile hammer—the model DE-30 McKiernan-Terry which eliminates either steam or air—was purchased by B. A. Sargent Co. of West Branch, Michigan, for bridge construction from R. G. Moeller Company of Detroit.

TO INCREASE the power reserve in his Bay City model 45 Backhoe, Ray D. Baker of Detroit has replaced the 3057C GM Detroit diesel with a model 4057C delivered by Peninsular Diesel of Detroit, Michigan.

THE WELDED Construction Company of Rosebush, Michigan, has received delivery on a model 15-B Bucyrus-Erie dragline shovel from Wolverine Tractor & Equipment Company of Detroit. The dragline has a UD 350 International Harvester engine and will be broken in around Stanton, Michigan.

R. J. MOELLER Equipment Company of Detroit has delivered an Austin Western Super 99 Grader to the Berrien County Road Commission of Benton Harbor, Michigan. Peninsular Diesel of Detroit will service the grader's 4-71 GM Detroit Diesel engine.

THE SED LOCK & Francisco Company of Trenton, Michigan, has just received a new TD-6 from the Detroit branch of Wolverine Tractor & Equipment Company.

GETMAN Brothers of South Haven, Michigan, has recently put to work a Worthington 600 Air Compressor, purchased from the Great Lakes Equipment Company of Muskegon, Michigan. The compressor's 6-71 GM Detroit Diesel engine will be serviced by Peninsular Diesel of Detroit.

THE CITY of Essexville, Michigan, has put into operation a model 450 Galion Motor Grader with an International Harvester UD-350 diesel, delivered by the Wolverine Tractor & Equipment Co. of Detroit.

AN International Harvester TD-14 Drott Skid shovel from the Wolverine Tractor & Equipment Co. was recently delivered to Bales Trucking & Supply at Adrian, Michigan.

ST. LOUIS Freight Lines of St. Louis,

Michigan, is putting a Cummins JT-6-B Turbodiesel into one of their Ford model F-900 trucks. This unit was purchased from the Detroit branch of Cummins Diesel Michigan Inc.

New Sales Manager

Diamond T Motor Car Company is pleased to announce the promotion of

Mr. Paul Gordon to the newly created position of Sales Manager of Service Parts. Mr. Gordon, a thirty-year veteran with Diamond T, was formerly District Sales Manager for Indiana, Kentucky, Tennessee and Southern Illinois. Among his accomplishments in the field are pioneering the Diamond T diesel truck in his territory and introducing Diamond T's into the rugged and demand-

ing service in Little Egypt's oil fields in Southern Illinois.

He has now been assigned the responsibility for service parts sales, and will work closely with the Diamond T dealer organization, recommending and developing dealer parts stocks to be sold at the retail level, and helping dealers merchandise their service facilities.

Impartial laboratory* tests prove...

Air-Maze oil bath air filter maintains at least 95% efficiency even at lowest engine speeds!

HERE'S WHY dozens of America's leading railroads are switching to Air-Maze oil bath air filters: An independent—completely impartial—testing laboratory compared the Air-Maze oil bath filter with other competing locomotive engine air filtering devices. Here's what they found.

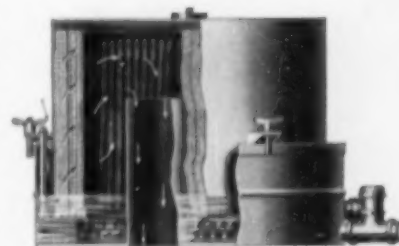
- The Air-Maze oil bath filter maintains at least 95% efficiency even at the lowest locomotive engine speeds! Such high filtering efficiency is possible because the Air-Maze oil bath air filter does not depend on high air velocity—as do other filtering devices—to deliver peak efficiency all the time!

- Equally important, the laboratory tests show that the Air-Maze oil bath air filter removes 59% more fine Arizona road dust than the next best filtering device.

No wonder top railroads are greatly prolonging power assembly life, greatly reducing service costs on hundreds of diesels used in freight, passenger and switching service . . . with Air-Maze oil bath filters. What's more, Air-Maze filters generally cost no more than other filtering devices.

FIND OUT FOR YOURSELF how you can save wear and maintenance on power equipment. Just write—Air-Maze Corporation, Cleveland 28, Ohio.

*Laboratory selected by one of our customers. Additional data furnished on request.



Engine air comes clean, scrubbed in a bath of oil—at all engine speeds with this Air-Maze oil bath filter. Abrasive dust and dirt can't get through to wear rings, ring grooves and liners!

The biggest names in diesels are protected by Air-Maze filters

ENGINE AIR FILTERS
CAR BODY FILTERS

AIR-MAZE

LUBE OIL FILTERS
PASSENGER CAR FILTERS

The Filter Engineers

Gulf Coast Diesel

Notes

By Michael T. Pate

PETERSON Hospital, Kerrville, Texas, is having San Antonio Machine & Supply Company, San Antonio, Texas, install a Waukesha diesel, rated 368 hp at

1200 rpm, as emergency power unit. The diesel was furnished by Waukesha Sales & Service, Inc., of Houston.

BLUDWORTH Shipyard, Inc., Houston, has bought from Fairbanks, Morse & Company two model 38F5¼, 8-cylinder marine diesel engines, each rated at 600 hp. The diesels are to be used as prime power units in a seagoing tug.

THE E. E. COMPANY, South Houston, Texas, has bought from Big 3 Welding Equipment Company of Houston four 250 amp. Lincoln welding generators. The units are powered by 4-cylinder, model DIX4D Hercules diesels, rated at 40.5 hp.

BREWSTER Bartle Drilling Company, Houston, through Oil Well Supply Com-

pany of Houston, has bought from Waukesha Sales & Service Company, Inc., Houston, two model 6WAKDBU Waukesha diesels, for delivery to the company's operation at Orange, Texas. The engines, rated 209 hp at 1600 rpm, will drive 100 kw generators.

GULF Oil Company, Houston, has bought from Mustang Tractor & Equipment Company, Houston, a 34 kw constant voltage generator set for service on an offshore rig. The generator is powered by a Caterpillar D315 diesel.

PAUL WRIGHT Electric Company, San Antonio, Texas, has bought from Applied Power & Equipment Company, Houston, an Allis-Chalmers diesel, model DAS1125, which will drive a 150 kw dc generator in the Federal Reserve Building at San Antonio.

ACE Supply Company, New Iberia, Louisiana, has taken delivery of a model 135DKU Waukesha diesel, rated 106 hp at 1800 rpm. The diesel was bought from Waukesha Sales & Service, Inc., of Houston.

MILAM Marine Construction Company, Milam, Louisiana, has bought from Stewart & Stevenson Services, Inc., Houston, two series 110, model 62206 General Motors diesels, each equipped with 4.5:1 hydraulic reduction and reverse gear. The diesels will power a 92 ft steel utility boat.

HUNT Tool Company, Houston, has bought two model 9660 Lincoln welding generators from Big 3 Welding Equipment Company, Houston. The units are powered by model DIX4D 4-cylinder Hercules diesels. They will be used for plant welding.

BREWSTER Bartle Drilling Company, Houston, has bought a model D342 Caterpillar diesel, 5¼ x 8 in., six cylinder, rated 190 hp at 1200 rpm, which will be used to power a pump in the company's offshore drilling operations. The diesel was furnished by Mustang Tractor & Equipment Company, Houston.

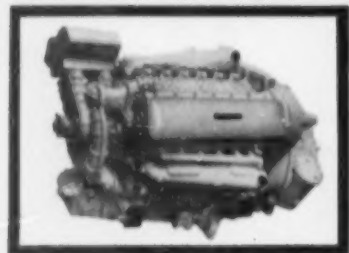
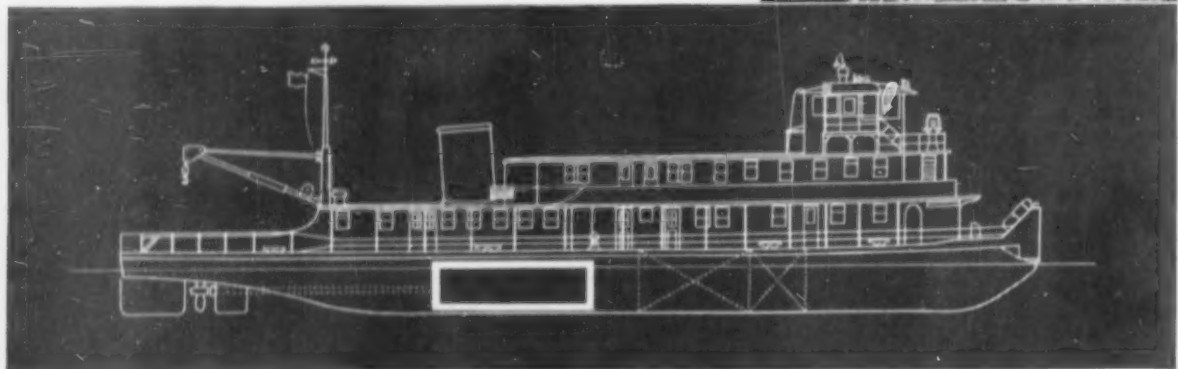
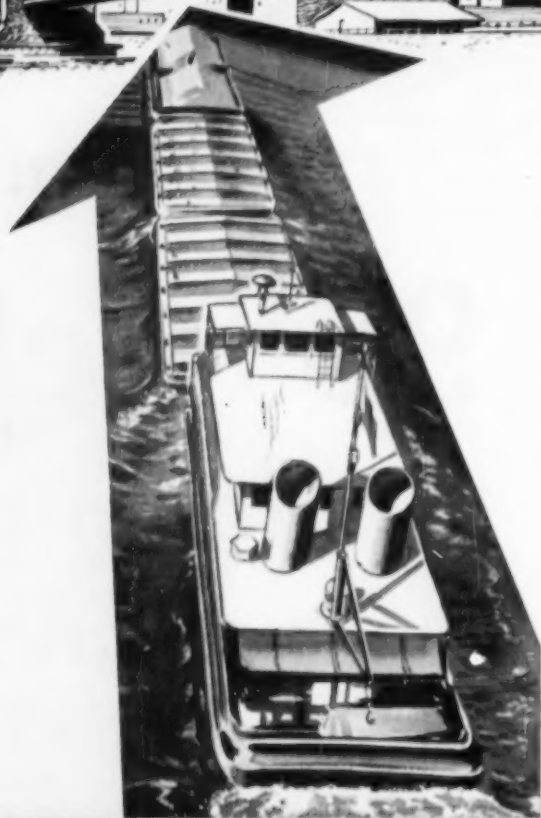
WORLDWIDE Supply Company, Houston, has bought from Waukesha Sales & Service, Inc., Houston, for the account of Manabi Exploration Company, two model 6WAKDBSU Waukesha diesels, rated 305 hp each at 1600 rpm. The diesels will be exported to the company's overseas operations.

BECHTEL Corporation, San Francisco, California, has bought from Big 3 Welding Equipment Company, Houston, five 300 amp Lincoln welding generators, each powered by a General Motors diesel, series 71, model 2055. The genera-



TOWARDS MARINE AUTOMATION

The locked engine room—dream of every towboat operator, builder and engineer—is brought nearer to reality by the use of Napier Deltic engines. On Deltic-powered towboats you can have complete, instrumented Pilot and Engineers' Remote Control Stations—a big step towards marine automation. There are other equally important reasons for using Deltics. They reduce vessel layup and increase earning capability. When a major overhaul is needed the low weight and compactness of the Deltic permit engine replacement in a few hours. Deltics (825-2,500 s.h.p.) have the best marine Diesel power/weight ratio in the world. Get in touch now with Napier's representative. He'll tell you more about the advantages of using Deltic Diesels.



NAPIER Deltic marine diesel

A NEW CONCEPTION OF MARINE POWER

Representative: L. O. Brooks, Dupont Circle Building, 1346 Connecticut Ave. N.W., Washington 6 D.C. Phone: North 7-0146

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Partners in Progress with The ENGLISH ELECTRIC Company Limited

CRC D21

tors will be shipped to the company's European operations.

S. & R. TOOL & Supply Company, Houston, has bought from Waukesha Sales and Service, Inc., of Houston, a model 148DKU Waukesha diesel, rated 149 hp at 1400 rpm. The diesel will be used in the company's rental and service operations.

SCHLUMBERGER Well Surveying Corporation, Houston, has taken delivery of three model DA273 Allis-Chalmers diesels each equipped with torque converter. Two of the diesels will have the new hydrotor starting system, and all three, rated at 60 hp will be used in the company's surveying rigs. The diesels were secured from Applied Power & Equipment Co., Houston.

GULF Bitulithic Company, Houston, is adapting to its Caterpillar D318 diesel driving a Caterpillar 6DKV generator the new Caterpillar constant voltage regulator. Both engine and regulator were furnished by Mustang Tractor & Equipment Company, Houston.

BANKS Moreland Company, Houston, has secured from Big 3 Welding Equipment Company, Houston, a 300 amp. Lincoln welding generator, powered by a series 71, model 2055, 2-cylinder General Motors diesel.

PARKER Brothers Drilling Company, Houston, is installing a model 6NKDBSU Waukesha diesel, rated 368 hp at 1200 rpm on one of its marine drilling units. The diesel was furnished by Waukesha Sales & Service, Inc., of Houston.

PURE OIL Company, Houston, has bought two 15 hp model 2BD77 Allis-Chalmers diesels from Applied Power & Equipment Company, Houston, who are equipping the diesels with Ford transmissions and adapting them to wire line drives for the company's offshore work.

HYDRAULIC Engineering, Inc., Houston, has secured from Waukesha Sales & Service, Inc., Houston, a model 180DLCU Waukesha diesel, rated 34 hp at 2200 rpm. The diesel will be used to drive a hydraulic pump.

WELDERS Supply Company, New Iberia, Louisiana, has taken delivery from Big 3 Welding Equipment Company, Houston, on five 300 amp. Lincoln welding generators, each driven by a series 71, model 2055 2-cylinder General Motors diesel.

EQUIPMENT Service & Rental Company, Houston, has obtained from Waukesha Sales & Service, Inc., Houston, one model 6WAKDBSU Waukesha die-

sel, rated at 325 hp, which will be used as prime power on one of the company's units.

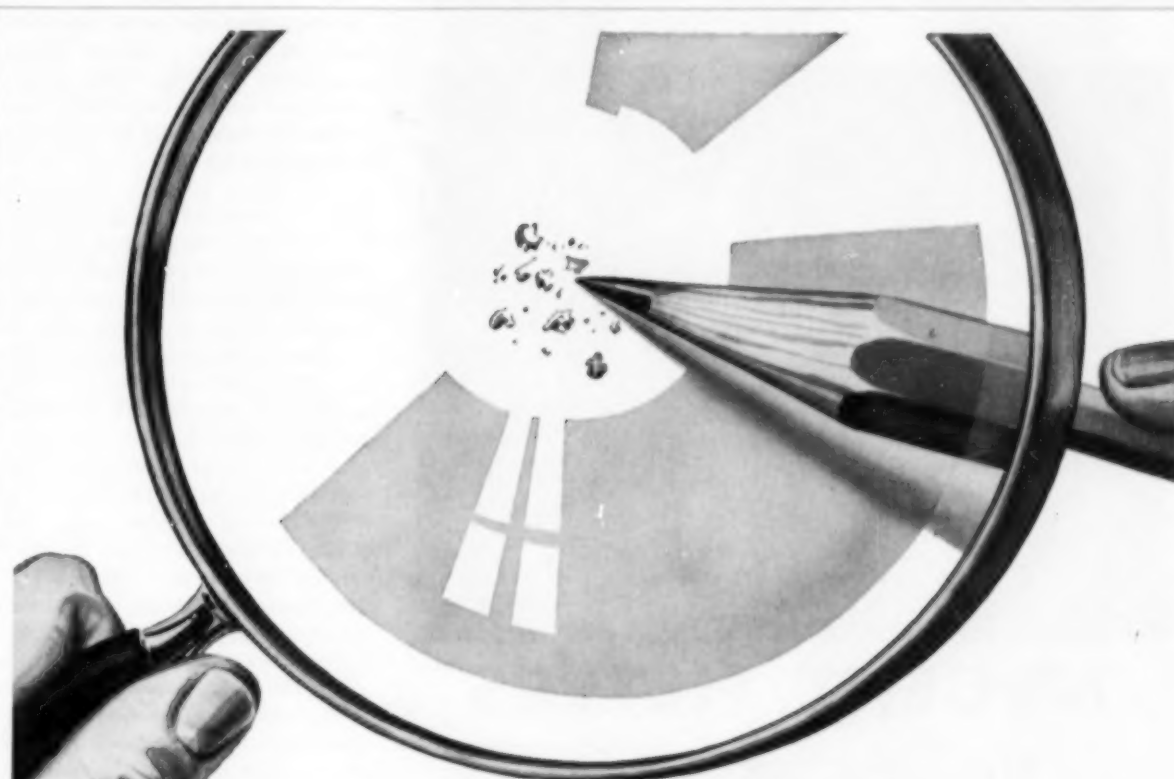
Engineering Personnel Changes

Two top engineering personnel changes were announced at Harrison Radiator Division, General Motors Corporation, one of them to fill the new position of

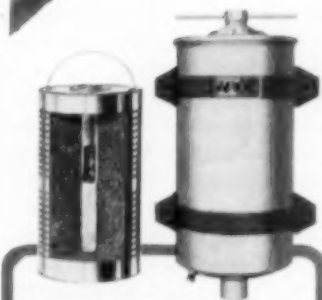
technical assistant to the general manager to coordinate special projects of an advanced design nature for future production. J. Ralph Holmes, chief engineer of the division, will assume the newly-created post, and he will be succeeded by Lawrence A. Zwicker, now assistant chief engineer for product engineering, according to Edward D. Rollett, general manager for the division.

Both Mr. Holmes and Mr. Zwicker will report to the general manager. Both appointments are effective December 1.

Now Mr. Diesel—Mohammed—if you can't find time to go to the customer mountain, try the boat show where the mountain comes to Mohammed every single year.



THAT MEASLY LITTLE GRIT ... Can and Does Chew Up Diesel Engines



Large-Capacity Filters — including the WF-750 Bar-type cover handle for heavy duty applications. Eliminates troublesome cover bolts, speeds cartridge changing.

Sock and Can-type Cartridges for Fuel and Lube Oil filtration.

Your choice of many outstanding Filtrants engineered to give you prescription-type Cartridges for your particular operating conditions.

Peak dirt retention capacity built into every Filtrant—giving you longer intervals between Cartridge changes and higher filter efficiency throughout the life of every Cartridge.

WIX makes a "big production" out of a little destruction ... but that "little destruction" can chew up *your* dollars *fast*!

Contamination in fuel and lubricating oil is a continuing problem—affecting construction equipment, trucks and buses, marine, railroad and stationary engines. The service life and performance pattern of your Diesel engines is directly related to the cleanliness of fuel and lube oil.

WIX Oil Filter Cartridges are the product of objective research and engineering. They do a superlative job of keeping oil clean—give you a solid form of insurance against excessive downtime, maintenance cost and engine wear.

Write today for the complete WIX Catalog of HEVI-DUTY Cartridges for Fuel or Lubricating Oils ... or for the assistance of WIX Filtration Engineers.

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CARTRIDGES / OIL FILTERS

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Northeast Diesel

Notes

By Arnold B. Newell

APPARENTLY the venerable fishing excursion boat *Glory* out of Sheephead Bay will at long last have a new engine. At least that is the belief of skippers of the fleet who say "after all an engine can't

last forever." The Cooper Bessemer diesel in the *Glory* has given some 34 years of dependable service and still runs quietly and dependably.

THE TRAWLER *Edith Jane* has just been completed by the Theriault Shipyard at Metegan River, Nova Scotia, for Captain Atheling Elms of Glace Bay. Of wood construction, the vessel is 59 ft long, 16 ft beam and 8 ft draft. The pro-

pulsion engine is a 154 hp Gardner diesel made in England.

THE GRIFFIN Equipment Corp. of Bronx, New York, has sold eight General Motors diesels, Model No. 6094, to the George M. Brewster Co. of Bogota, N. J., to repower eight Euclid tractors. The engines are equipped with Hydro-starters.

THE NEW York office of the American Bureau of Shipping reports the placing of a contract for a 200 ft 4320 hp twin screw diesel towboat with Dravo Corporation of Pittsburgh by the Mississippi Valley Barge Line Co.

THE ST. MARYS Hospital of Passaic, N. J., is having a 250 kw emergency generating set installed by the J. W. Broadfoot Co. The set, sold by Griffin Equipment Co. of Bronx, N.Y., consists of twin General Motors 6-110 diesels driving a Delco generator on a common base and equipped for automatic starting in case of power failure.

THE DEPARTMENT of Public Works of New York City has made public some details of two new fire boats for which bids were to be opened October 31. Dimensions are: length 128 ft, beam 30 ft and draft 9 ft. Two propulsion diesels of at least 500 hp each will drive controllable pitch propellers. Separate engines will drive two fire pumps to deliver 8000 gpm at 150 psi. The sum of \$1,947,000 has been earmarked for construction of both boats. The New York firm of Newton H. Whittelsey, Inc. designed the boats.

A STANDARD type of 40 ft. auxiliary ketch designed by Geerd Hendel is being offered by Camden Shipbuilding Co. of Camden, Maine. The diesel propulsion engine is a 40 hp Red Wing motor. The same distributors sold a similar set to Spearin-Preston & Burrows for use on their Burma Road job at Jersey City, N. J.

ORLANDO and Edenwald has put into service a Gormon-Rupp centrifugal pump driven by a General Motors 3-71 diesel. The owners are using the unit on their New England Truway Contract at Bridgeport, Conn. Griffin Equipment Corp. of Bronx, N.Y., made the sale.

THE *SEAFLOWER*, a 49 ft auxiliary yawl, has been completed by Pane E. Luke of East Boothbay, Maine, for Steven M. Castle of Stonington, Conn. A Mercedes-Benz diesel is installed as a kicker for use when not under sail.

SOME further details of the installation of 10 Caterpillar D 397, 450 hp diesels by the City of Hartford for flood control have been released by H. O. Penn

Machinery Co. who made the sale through their Newington, Conn., branch. Six will be installed at the South Meadow pumping stations. They will drive existing Morris mixed flow centrifugal pumps rated 36,000 gpm at 30 ft head. Four new De Laval pumps of the same type and rating will also be installed. Silencers are Maxim, heat exchangers are Ross, Twin Disc clutches will be used with Philadelphia spiral bevel right angle drive to the pumps.

A. C. SCHULTES & Sons of Woodbury, N. J., recently added another G-M 4-71 diesel to a list of several other engines of the same make used in their well drilling work. Frantz G-M Diesel Inc. of Philadelphia made the sale.

A SIMILAR engine has been sold by the same firm to Patterson Oil Company of Paulsboro, N. J., for cargo pump operation on their oil barge Patoli.

A SAWMILL owned by H. S. Lafferty of Richmond, N. J., has just been repowered by a 4-71 G-M diesel sold by Frantz G M Diesel, Inc. of Philadelphia.

ELLICOTT Machine Corp. of Baltimore, Md., has just delivered a 1700 hp diesel-electric, self-propelled river dredge to the Colombian Government for use on the Magdalena river. The 1200 hp main engine and 500 hp auxiliary are General Motors diesels.

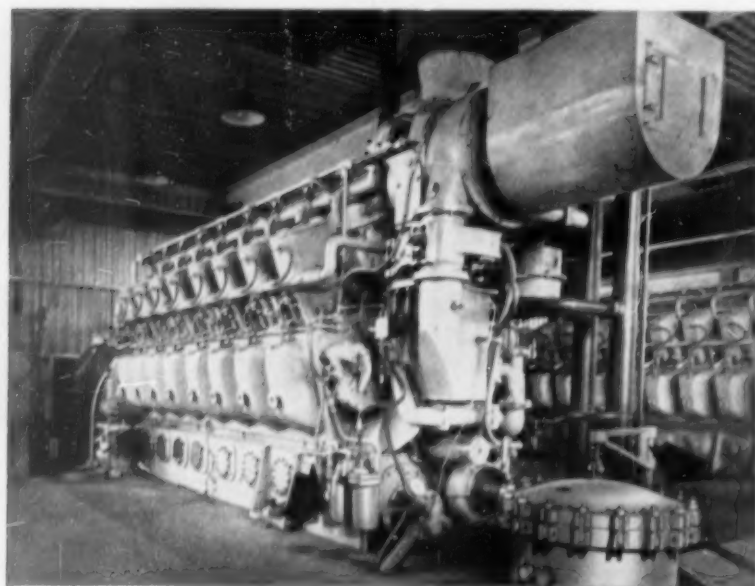
THE AMERICAN Bureau of Shipping reports 163 diesel driven and 11 diesel-electric vessels currently under construction to A B S classification. The combined power of these boats is 695,190 hp, making an average per boat of 3989 hp.

IN CONNECTION with repairs to a Burro Crane, Florence Foundry & Machine Co. of Florence, N. J., has purchased a 3-71 G. M. diesel from Frantz G M Diesel, Inc. of Philadelphia.

THE NAVAL Hospital at Quantico, Virginia, has installed a Fairbanks Morse 200 kw emergency generator set. The engine is an opposed-piston F-M 4-cylinder Model 38F-51 $\frac{1}{4}$ operating at 1200 rpm. The installation was made by the Plymouth Electric Company of Washington, D.C., and the sale was made by the Baltimore branch of Fairbanks Morse & Company.

AT Provincetown, Mass., Thyers Boatyard has installed a new G-M 6-110 diesel in the *Liberty Belle* owned by Henry Passion.

THE HATLOW Fisheries Inc. of Reedville, Virginia, purchased two 8-cylinder Fairbanks Morse O-P engines, also Model 38F-51 $\frac{1}{4}$ to repower the fishing vessel



NUGENT FILTERS

... the best protection any engine can have

Nugent Filters protect both lube and fuel oil for the Alco 251 Diesels installed at the Laton (Kansas) Pumping Station of the Service Pipe Line Company. This recently built pipeline conveys crude oil from Fort Laramie, Wyoming, to Freeman, Missouri.

To help guard against the serious consequences of a power failure, a Nugent No. 1555-4L12 filter provides the Alco Diesels with full flow filtering of lube oil. The filter cleans all the engine lube oil in circulation every cycle before going to the bearings, removing particles as small as 2 or 3 microns.

Fuel oil, too, receives the protection of Nugent filtering. A No. 1555-BF-1R Duplex Filter is mounted on the suction side of the fuel oil pump—protection for trouble-free injection.

You can prevent harmful impurities from reaching spots where they can accelerate wear, shorten engine life or cause power stoppage by employing Nugent Filters. They offer a choice of full flow or by-pass filtering with the same unit. Recharges are inexpensive and easy to change. Simple piping makes installation no problem.

Let Nugent show you how to insure long engine life—write for descriptive literature.



Wm. W. Nugent & Co., Inc.
3441 Cleveland St. Skokie, Illinois

OIL FILTERS, OILING AND FILTERING SYSTEMS, TELESCOPIC OILERS, OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS
Representatives in Boston • Cincinnati • Detroit • Houston • La Junta, Colo. • Los Angeles • Minneapolis • New Orleans • New York • Philadelphia • Portland, Ore. • San Francisco • Seattle • St. Louis • Tulsa • Representatives in Canada: Montreal • Toronto • Vancouver

Established 1897

John O which is a former minesweeper 135 ft long. The Baltimore branch of Fairbanks Morse & Company made the sale of the engines.

THE McWILLIAMS Blue Line of New York has taken delivery of an unusual oil barge built by Higgins, Inc. of New Orleans. The 237 x 43 x 14 ft vessel has all the characteristics of a tanker of this size except for propulsion engines. It is, however, equipped with Cummins diesels to drive the cargo pumps. Cargo is heated by steam.

ROBERTS & Turner of Lewiston, Maine, sold 36 Continental TD 6427 diesels to Coles Express Co. of Bangor, Maine, to re-power a fleet of trucks.

National Motor Boat Show

Contracts went into the mail recently to a record total of 321 companies in the boating industry which have applied for exhibition space in the 47th annual National Motor Boat Show to be held in New York's Coliseum, January 19-27, according to Joseph E. Choate, manager. This list of exhibitors tops the all-time high set at the 1953 boat show by 73 companies and exceeds by 89 firms the number of exhibitors in last year's exposition, which broke all previous attendance records, including single high day and run-of-the-show at Kingsbridge Armory in the Bronx. Choate pointed out that the additional space available in Manhattan's glamorous new Columbus Circle showplace has paved the way for the increased number of exhibitors. This number is expected to grow as there still is space available for qualified small boat, marine engine and nautical accessory manufacturers.

Highlighting the seven-acre display on all four floors, 94 boat builders will show everything from tiny children's rowing prams up to huge cruisers and auxiliary sailboats. This represents a gain of 42 per cent in the number of boat exhibitors in the National Show as compared with last year's display. Twenty-four major manufacturers of gasoline and diesel inboard engines and the very popular outboard motors will place their 1957 lines on display, and 203 producers of boating accessories and services will add to the annual extravaganza which has been called boating's principal national market place.

Plans Earthmoving School

Anticipating an acute shortage of experienced construction equipment operators when the new U.S. highway program is under way, Greer Technical Institute, 2230 S. Michigan Ave., has taken steps to alleviate this situation by opening an earthmoving school in Braid-

wood, Ill., according to Keith M. Hutchison, manager of the school's Heavy Equipment Division. Located on a 600-acre tract, 20 miles south of Joliet, the school will teach men to operate a complete line of earthmoving and motor truck equipment manufactured by International Harvester Company's Construction Equipment and Motor Truck Divisions. Greer selected Harvester's full line of equipment because of Harvester's nearby manufacturing and service facilities.

Three courses are planned. They include (1) operation and maintenance of crawler tractors, dump trucks, loaders and scrapers; (2) motor graders; and (3) all-inclusive instruction covering all machines. Cost of the 200-hour, five-week, crawler tract instruction course is \$295; with the 160-hour, four-week, motor grader course listed at \$225; while the comprehensive, 320-hour, eight-week course is \$460. Students enrolled in crawler tractor and motor grader courses will be given 24 hours of instruction jointly on engine theory and 16 hours on preventive maintenance.

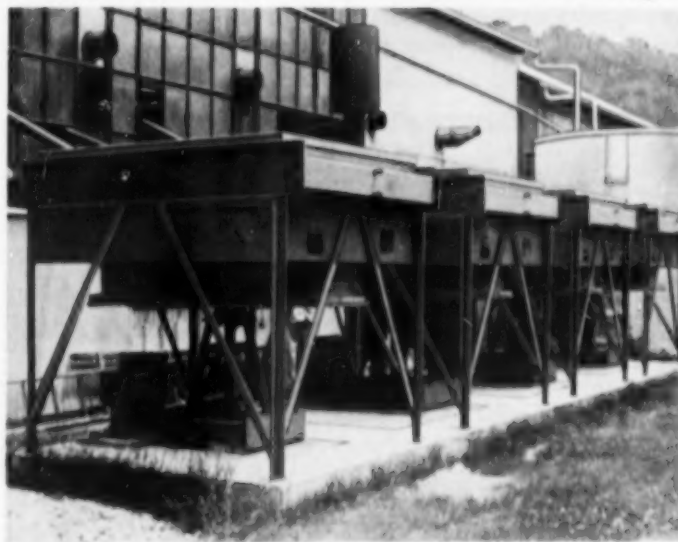
In addition to the foregoing, crawler tractor students will receive 40 hours of intensive training in such important subjects as: Dump truck operation and maintenance, plus crawler tractor, Hough Payloader and scraper operation and maintenance. Motor grader students, on the other hand, will be taught all phases of unit operation, 48 hours on grading, spreading, terracing, cutting and filling, and 72 hours on shouldering, bank sloping, and finish grading.

Five instructors, totaling 50 years of experience among them in construction work, offer assurance that the school will produce competent operators. The length of the courses are minimum estimated requirements to produce good operators, the Greer school said, while tuition fees have been set low to permit a large enrollment. Living quarters are available nearby at nominal cost. At a later date, dormitories will be constructed on the grounds. Restaurant facilities also will be constructed on the grounds in the future. Meanwhile, students will be transported to a nearby restaurant. Students are required to submit \$50 with their applications, with the balance due upon enrollment. Greer Technical Institute was founded in 1902 and is headed by Erwin Greer, president.

And now that you happened by accident to dump a bucket of dirty kerosene over the weather rail, it is to expect the bo'n to absent mindedly play the fire hose down the engineroom skylight, all of which makes life at sea more interesting.

Young Engineering Talent

Pays off for Gas Utility*



*South Penn Natural Gas Co. Station, Smithfield, West Va.

Young "HC" Atmospheric Radiators

eliminate cooling water supply problems

The Problem: To replace an old cooling tower serving gas compressors. A nearby creek furnished the uncertain water supply.



How Young solved it

Young HC Horizontal Core Cooler and Condenser

Four Young Radiator Company HC Atmospheric Radiators were specified to cool four 165-hp compressor engines. Natural gas is compressed from local field lines and well-head to pressures suitable for shipping to distant sales points. Installation of the Young Units has modernized the compressor cooling system. In addition it has made the utility independent of the uncertain water supply.

- A. Independent mounted fans eliminate unit vibration.
- B. Coils designed for easy access to tube ends.
- C. Coils supplied for any operating pressure.
- D. Steel tanks treated for corrosion resistance.

Write Dept. 406-M for FREE Catalog

Put **Young Talent** to work for you . . .

Solving heat transfer problems is what we do best because it is our very reason for being. You, too, can harness the power of Young engineering talent. Write, wire or call without obligation.



HC is a registered trademark.

Young RADIATOR COMPANY
RACINE, WISCONSIN

Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY
Heat Transfer Products for Automotive, Heating, Cooling, Air Conditioning Products
Aviation and Industrial Applications. for Home and Industry.
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Moline, Illinois

Mid-Continent Diesel News

By Jack F. Cozier

ALTUS Air Force Base and the Ardmore Air Force Base have in operation eight LeRoi H-844 gas engines, four at each base, driving eight Peerless 200

hp eight in. pumps. The units are used for emergency fire fighting and were sold by Carson Machine & Supply, Oklahoma City, Okla.

GRAY County, precinct No. 3, Pampa, Tex., bought a Cat D12 motor grader from West Texas Equipment Co., Amarillo, Tex., for county road maintenance and construction. This brings the

number of Cat motor graders to twelve that the county has in service.

BROCE Construction Co., Woodward, Okla., has in operation two CH-30 Vibro-Plus rollers powered by Waukesha model 180D-LO diesel engines. The units are in use on the Will Rogers turnpike and were sold by the Tulsa Equipment Co., Tulsa, Okla.

W. G. BURGESS Construction Co., Tulsa, Okla., purchased a Cat 955 traxcavator from McCormick Machinery Co., Tulsa, for general street construction.

ST. LOUIS Shipbuilding & Steel Co., St. Louis, Mo., has bought four 640 hp, 4 cylinder, model 38D8-1½ non-reversing Fairbanks, Morse marine engines.

RED BALL Construction Co., Broken Arrow, Okla., has bought an International TD-14 tractor powered by an International diesel engine from Clarence L. Boyd Co., Tulsa, Okla. The unit will be used for soil conservation work.

OKLAHOMA-Mississippi River Products Line, Inc., Tulsa, Okla., is installing an Alco V-12-9 in. x 10½ in.-251 B, 1550 hp, dual-fuel engine in the station at Conway, Ark. The unit will be driving a 6x8x12½ MSB-4 stage Bingham pump. The sale was made by Alco Products, Inc., Tulsa.

S. R. SMITH Co., Tulsa, Okla., are powering an Allis-Chalmers front-end loader with a GM 2-71 diesel engine from Diesel Power Co., Tulsa, for material handling work.

HARRIS Construction Co., Ardmore, Okla., purchased a Cat D6 tractor with bulldozer for oil field construction work. The sale was made by McCormick Machinery Co., Tulsa, Okla.

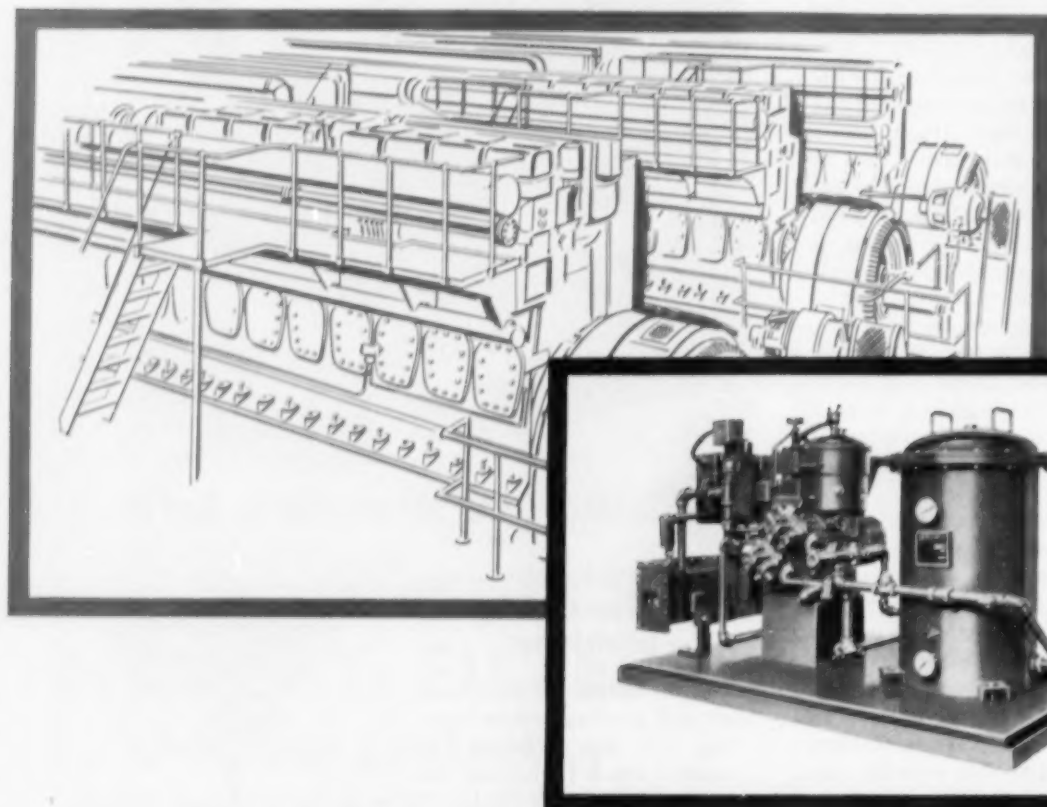
PUBLIC Service Co., Tulsa, Okla., bought an Oliver OC-18 crawler tractor with a cable dozer and double power control unit from Midwestern Engine & Equipment Co., Tulsa. The unit powered with a Hercules diesel engine will be used for expansion work at the Arkansas River power plant.

DOYLE Gilbert Construction Co., Hobart, Okla., has received a 600 cu ft Chicago Pneumatic rotary compressor powered by a GM 6-71 diesel engine for use in a rock quarry. The unit was sold by R. A. Young & Son, Inc., Tulsa, Okla.

THE Western Company, Midland, Tex., recently added 31 International RDF-195 trucks each powered by a Cummins JT-6 turbodiesel engine to add to their fleet trucks used for well servicing.

SMITH Brothers, Noble, Okla., have a CH-30 Vibro-Plus roller in operation on the Will Rogers turnpike powered by a Waukesha model 180D-LO diesel engine. The roller was sold by Tulsa Equipment Co., Inc., Tulsa, Okla.

JACK Briscoe Construction Co., Stillwater, Okla., purchased a Cat D6 tractor with bulldozer from McCormick Machinery Co., Tulsa, Okla. The unit will be used for paving construction.



DE LAVAL "PURI-FILTER" REMOVES IMPURITIES WITH ONE PASS!

The De Laval "Puri-Filter", designed to remove all trouble-making diesel lube oil impurities, provides complete purification in just one pass.

Centrifugal action takes out solid contaminants and water... filters remove colloidal carbon and other minute impurities down to one micron (0.000039") in size. Used oil is restored to "like-new" condition while additives for oil improvement are retained.

A De Laval "Puri-Filter" means longer engine life... fewer over-hauls... reduced ring sticking and bearing wear... increased oil life... simplified maintenance... greater operating economy and efficiency all down the line.

Get all the facts! Write for the "Puri-Filter" Bulletin today!



THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO., 201 E. Millbrae Ave., Millbrae, Calif.

AMERICAN Shipbuilding Co., Cleveland, Ohio, bought eight 12 cylinder, 2400 hp, model 38D8-1/4 and six 5 cylinder, 375 hp, model 38F5 1/4 Fairbanks, Morse marine diesel engines.

M & N TRUCK Co., Nowata, Okla., purchased a Cat D7 tractor with bulldozer and control unit for general construction work. The unit was sold by McCormick Machinery Co., Tulsa, Okla.

CRAIG County, Oklahoma, received a Galion T-500 motor grader for county road work. The unit, sold by Clarence L. Boyd Co., Tulsa, Okla., utilizes the power of a Cummins diesel engine.

LAYMAN & Son Construction Co., Tulsa, Okla., has repowered a Northwest model 25 shovel, used for general construction work, with a GM 4-71 diesel engine from Diesel Power Co., Tulsa.

PARMAR County, Farwell, Tex., took delivery of their eighth Cat motor grader from West Texas Equipment Co., Amarillo, Tex. These machines are used for county road construction and maintenance.

PETER Kiewit Sons Co., Wichita, Kan., is using two CH-30 Vibro-plus rollers on the Will Rogers turnpike purchased from Tulsa Equipment Co., Tulsa, Okla. The two units are powered with Waukesha model 180D-LO diesel engines.

BARECO Oil Co., Barnsdall, Okla., purchased an International 450 gas engine driving a Marlow 6 in pump for emergency water and fire pump use. The sale was made by Carson Machine & Supply Co., Tulsa, Okla.

SERVICE Pipe Line Co., Layton, Kan., has in operation two Alco V-16-9 x 10 1/2 251B dual-fuel engines driving a Bingham pump on a crude oil line.

PARTON & Parton, Henrietta, Okla., bought a Cat D7 tractor with bulldozer for PMA and SCS construction work. McCormick Machinery Co., Tulsa, Okla., supplied the unit for this sale.

NATIONAL Cash Register Co., Dayton, Ohio, purchased a Fairbanks, Morse 7 cylinder, 525 hp, model 38F5 1/4 generating set.

METROPOLITAN Construction Co., Oklahoma City, Okla., is utilizing a Vibro-Plus roller purchased from Tulsa Equipment Co., Inc., Tulsa, Okla., on the Will Rogers turnpike. The unit is powered by a Waukesha model 180D-LO diesel engine.

STAMPER & Payne, Claremore, Okla., has bought a Cat D7 tractor with hydraulic bulldozer from McCormick Ma-

chinery Co., Tulsa, Okla., for SCS conservation work.

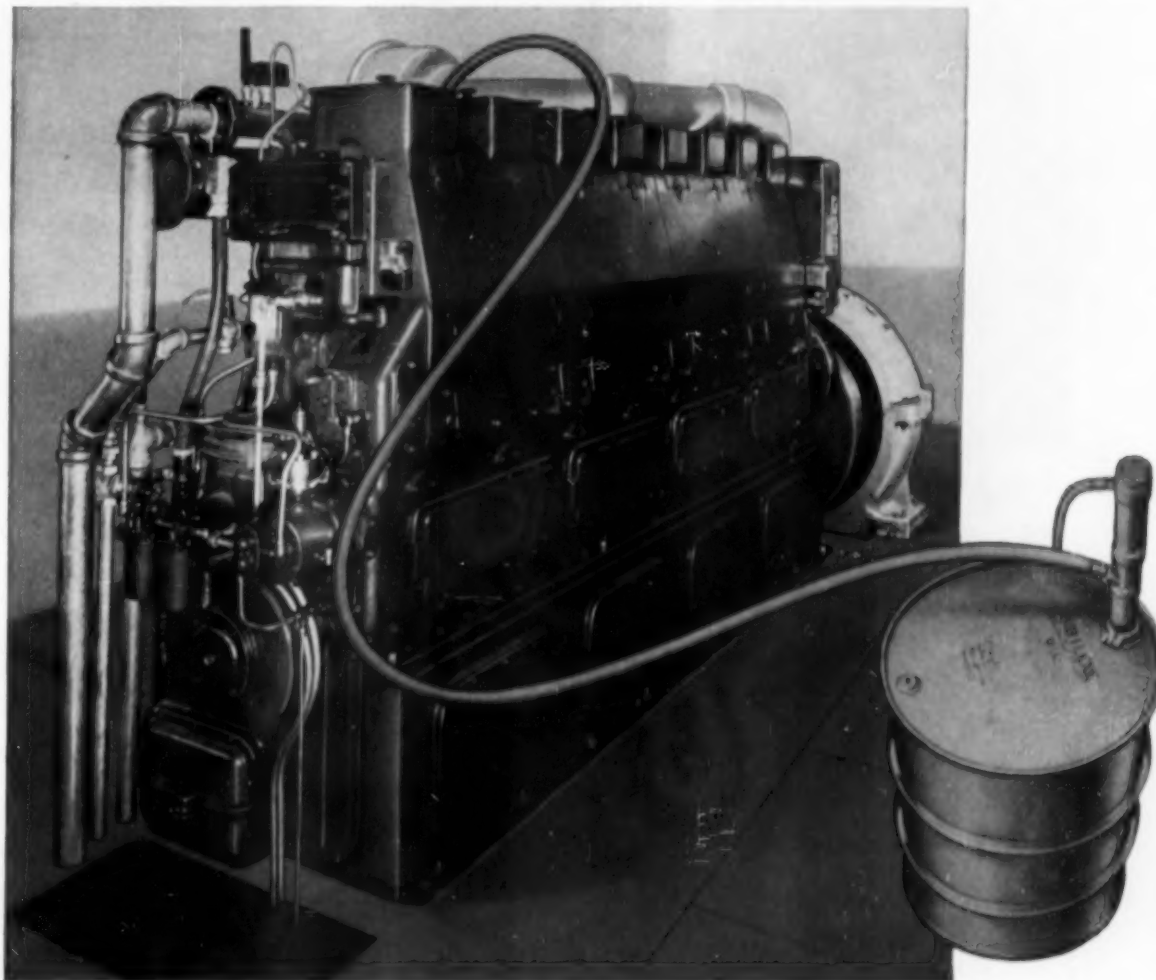
HASKELL Lemon Paying Co., Oklahoma City, Okla., has purchased an International TD-18A tractor with an International diesel engine. Clarence L. Boyd Co., Tulsa, Okla., has delivered the unit for road construction in Southern Oklahoma.

Director Of Manufacturing

Elmer D. Robinson, formerly Assistant to the President, Morse Chain Company, Ithaca, New York, has been appointed Director of Manufacturing. The announcement of the appointment was made by Stanley J. Roush, President and General Manager of the Borg-Warner Industry. Robinson will head up all

Morse manufacturing, quality control and industrial relations at the Ithaca, New York; Detroit, Michigan, and Simcoe, Ontario, plants.

A graduate of Rutgers University and a native of New Jersey, Robinson has had more than 20 years' experience in production management positions in the metal-working industry.



Stops Thin-Out!

You can protect your Diesel against wear due to excessive thin-out of the lubricating oil at higher operating temperatures. Switch to Sinclair RUBILENE®, the high viscosity index oil proved by over 35 years in a wide variety of Diesel applications. You'll find RUBILENE holds its high film strength and reduces oil consumption . . . gives you better protection of cylinders, pistons, rings and other vital moving parts operating continuously for long periods. Your Diesel logs more full-power hours!

Switch now to RUBILENE. Regardless of the make of your Diesel, there's a member of Sinclair's famous RUBILENE or RUBILENE HD family that meets your needs exactly! Call your local Sinclair Representative or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation!

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First cost is only cost when you buy Thomas Flexible Couplings... because Thomas Flexible Couplings are correctly engineered... have no wearing parts... need no lubrication... eliminate future maintenance costs. Even more, Thomas all-metal couplings are open for inspection while running—ending inspection shut-downs!

For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last forever.

NO LUBRICATION... NO MAINTENANCE...

There Are No Wearing Parts

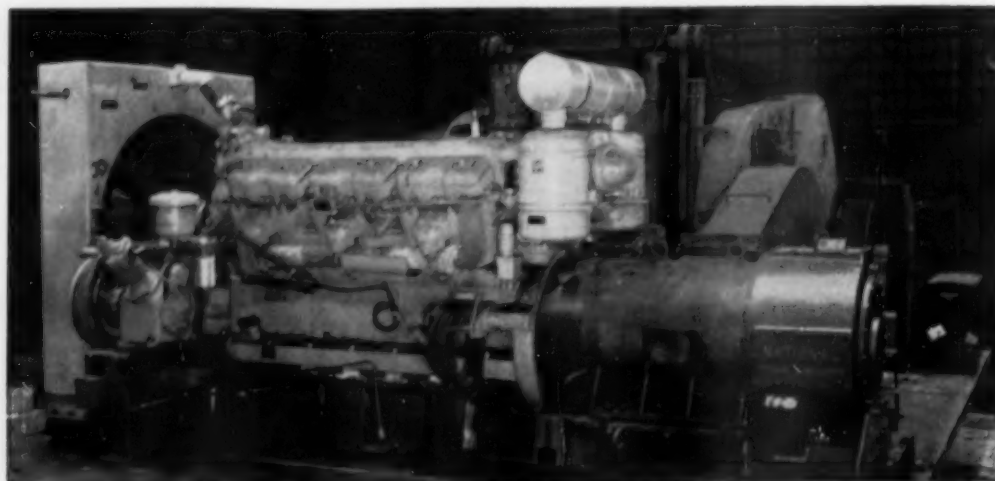
Under load and misalignment, only Thomas Flexible Couplings offer all these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Smooth, continuous drive with constant rotational velocity
4. Visual inspection while operating
5. Original balance for life

Write for Engineering Catalog 51A



Big Job For Torque Converter



First National Supply Company Torque converter for excavating service was installed on a Lima Type 2400, 6-cu yd shovel powered by a 12-cylinder Caterpillar diesel of 473 hp. The shovel has been in coal stripping service for H. E. Drummond Coal Company, Jasper, Alabama, for several months.

The National converter, near the right rear corner of the rotating base, has both input and output drives on the inner side. The single-stage unit multiplies torque automatically and steplessly be-

tween ratios of 1:1 and 3:1 as required, thus simplifying the operator's job and assuring fast and smooth digging operation without shock loads on machinery. Development of the National torque converter resulted from a need for heavy-duty performance in units of high power capacities in oil well drilling service. Three years of this kind of operation led to the availability of these torque converters to other industries. The National torque converter is now standard equipment on Lima Type 2400 excavators.

Field Sales and Service Staffs



L. A. Steele



R. W. Phillips

The Detroit Diesel Engine Division of General Motors has expanded its administrative sales and service facilities by establishing regional operations in six key cities throughout the country. Headquarters for regional areas have been established within the last 90 days in New York, Atlanta, Detroit, Chicago, Dallas and San Francisco. In announcing the expansion program, Robert E. Hunter, general sales manager, said the new regions would expedite and provide additional assistance to distributors, dealers and equipment manufacturers in working out the ever-increasing power requirements of their customers.



J. C. Campbell



D. E. Schwendemann

Headed by a regional manager and staffed by sales, sales engineering, service and office personnel, each office will provide a basis for coordi-

nating the entire sales and service efforts in the region. The effect of the move will be to speed up interpretation of users' needs, provide faster processing of orders, faster response to service needs and further develop a consciousness of customer requirements.



R. L. Burpee



Eric Sutton

In charge of the regions are the following regional managers: L. A. Steele, New York; R. W. Phillips, Atlanta; J. C. Campbell, Detroit; D. E. Schwendemann, Chicago; Eric Sutton, Dallas and R. L. Burpee, San Francisco. All have held key posts at the home office in Detroit and are well known in the diesel engine industry. Regional office addresses are: New York, New York (New York Region), Coliseum Office Bldg., 10 Columbus Circle, Phone: Plaza 7-4000 Ext. 8181. Atlanta, Georgia (Atlanta Region), 619 Fulton National Bank Bldg., Phone: Jackson 4-7941. Wayne, Michigan (Detroit Region), 36501 Van Born Road, Phone: Parkway 1-1000. Oak Park, Illinois (Chicago Region), Avenue State Bank Bldg., 112 N. Oak Park Avenue, Phone: Village 8-8910, Esterbrook 9-4255. Dallas, Texas (Southwestern Region), 1717 Adolphus Tower, Phone: Riverside 1208. San Francisco, California (Western Region), 1426 Russ Building, Phone: Exbrook 7-0273.

New Cooling Equipment Line

The Perfex Corporation is pleased to announce their development of remote radiator type coolers for engine cooling, compressor cooling, and process cooling for industrial and oil field applications. These coolers are available for water cooling with oval radiator type tubes for low pressure use, and with round tubes for higher pressures. Perfex has put into these coolers their 45 years of experience in engineering and manufacturing heat transfer equipment. The engineer directly responsible for the design of these large radiators is Mr. Hiram J. Kinkade, who himself entered the heat transfer field in 1925, and has devoted more than 30 years to heat transfer engineering in all its phases.



These large radiators are built in two separate types; the vertical or V Type with vertical cooling coils and vertical fans for horizontal air discharge, and the horizontal or H Type with horizontal cooling coils and horizontal fans for vertical air discharge. The V Type is made in a complete line consisting of 24 Models in 12 fan sizes. These range in cooling capacity from 200,000 btu per hour to 7,200,000 btu per hour at 100 degrees F temperature difference between the entering air and the hot fluid. The V Type is made for water cooling with either oval tubes or round tubes.

They may also be used for cooling oil, compressed air, and compressed hydrocarbon gases; as well as for steam condensing, hydrocarbon vapor condensing, and for cooling almost any liquid or gas at any temperature and pressure. Almost any combination of the above cooling services may be combined in a single cooler; such as engine jacket water cooling, lubricating oil cooling, and the cooling of one or more stages of compressed air or gas.

The horizontal fan H Type coolers are made in 72 Models with 16 fan diameters, from 27 in. diameter to 22 ft diameter. The cooling capacity varies from 400,000 btu per hour to 40,000,000 btu per hour at 100 degrees F temperature difference between the entering air and the hot fluid. These coolers are made for the same services, and combinations of services as the V Type, but are built in larger sizes, and with the inherent advantages of vertical air flow. The largest sizes are made with round tube coils only, but many of the smaller models can use for water cooling the more efficient oval tube radiator cores. On both types of radiators the oval tube water cooling cores are made with brass tubes and copper fins, but inhibited admiralty

metal can be used for either tubes or fins, or both.

The round tube coils may have tubes of almost any metal such as brass, copper, admiralty metal, cupro nickel, steel, and aluminum. The fins on the round tube coils are normally of aluminum, but can be made of other metals if required by the intended service.

On all units the fans have adjustable pitch blades of airfoil section for efficient operation, and low horsepower consumption. Most of the fans used have aluminum blades, but other blade materials may sometimes be used as necessary. For the V Type coolers the fans are usually Vee belt driven, but some fans may be mounted on the output shaft of a slow speed electric motor or a gear motor. For the H Type coolers small fans are usually mounted on the shaft of an electric motor, and larger fans are either driven through Vee belts or through a right angle gear box. The motive power for the fan drive may be supplied by an electric motor, an internal combustion engine, a steam turbine, or a hydraulic motor. Both types of coolers have available accessories such as core guard screens, belt guard screens, manual shutters, automatic shutter operators and controls, motors, fan drives, motor starters and controls, pumps, idlers.

Certain fans can be equipped with a controllable pitch mechanism, so that the pitch of the fan can be changed during operation. This pitch adjusting mechanism is usually controlled automatically by a modulating type thermostat. These two types

of cooler with the many models comprise a complete, versatile line of cooling equipment for almost any service. They are engineered and built to the highest standards, and will meet the requirements of exacting and continuous service for the life of the plant. They are especially designed for the rugged service of cooling large engines, and for the conditions existing in oil field and industrial applications.



An oxygen fired de-carbonizing torch will clean the carbon out of an engine, but what's wrong with clean combustion, correct lubrication and effective oil control rings? In other words keeping the job clean is better than having to clean it up periodically.

MORAN HAS USED BRIGGS FILTERS SINCE 1941

IF YOU USE OIL
FILTERS, BY ALL MEANS
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two booklets offer you an opportunity to check your own performance re-
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BETTY MORAN
BRIGGS PROTECTS THEIR
POWERFUL NEW DIESELS



Built by St. Louis Shipbuilding and Steel Co.
Powered by 2 1,000 HP Diesels

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THE BRIGGS FILTRATION COMPANY, DEPT. 138
WASHINGTON 16, D. C.

YES Send me your two booklets as
offered above.

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Company

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Florida Diesel News

By Ed Dennis

TWO General Motors 4-71 diesels are being used to supply power for the two portable pumping units mounted on a platform over the Miami Canal at Hialeah. Power is supplied through G. M. power take-offs to pumps from Johnson

Gear Co., specifications are bhp 50 at 1160 rpm, ratio 4:3 vertical shaft HD70, the turbine pump is rated 6500 gpm at 1160 rpm with a 20 ft head; Maxim silencers are used.

RECENT Cummins dieselized trawlers added to the fishing fleet included the *Harry Michael* with an NRT6-M turbo-charged diesel and 4:1 r&r gears rated

300 hp at 2100 rpm and the *Breueridge* with an NHM600 Cummins 200 hp diesel.

FIVE Tourn-a-pull E9 road scrapers with 3-71 G. M. dieselized Turn-a-doers as power for Brooks Paving Company's road contract on highway #441. A Marion 32M dragline and a General 1/2 yd dragline are also moving dirt on this

modernization program. Both draglines are powered with 3-71 General Motors diesels.

TAMIAMI Trail Tours has placed 12 new 41 passenger Silverliner busses in service to run across Florida's Everglades between Miami and Tampa. They are powered with General Motors diesels model 4104, direct drive. This makes a total of 56 dieselized busses and they expect to receive more in 1957.

TWO model DFXH Hercules diesels for the new portable dredge being built for George Pearce at Auto Marine Engineers, Miami. The one to power an 8 in. Maddox pump is rated 165 hp cont. at 1200 rpm, the other to drive a 60 kw-230 volt generator. These are the 5 3/4 x 6 935 cu in. displacement diesels.

A COOPER-BESSEMER model GS-6, rated 340 hp at 550 rpm, powers one of the largest Bucyrus-Erie draglines in South Florida. Owned by the Hooper Equipment Co., it stockpiles about 200 yards of rock per hour.

AT Jacksonville Beach, the McClure Electric Co. took delivery of a model 38F5 1/4 Fairbanks Morse diesel generating set rated at 450 hp.

HERCULES diesels with torque converters power the Hough Payloader tractor shovels that were delivered to Toppino Bros. of Key West and the Rubin Construction Co. of West Palm Beach from Florida Georgia Tractor Co.

AT FORT Lauderdale the Industrial Construction Co. had their tug *Maco* repowered from a gasoline engine to a General Motors 6-71 diesel with 3:1 Twin Disc r&r gears; installation and engineering done by Ellis Diesel Sales and Service of Fort Lauderdale.

FLORIDA State Road Department received a Le Tourneau-Westinghouse road scraper powered with a JF6BI Cummins diesel and the Hubbert Construction Co. took delivery of a Galio motor grader with a HRFBI Cummins diesel.

TAMPA Marine Co. has sold its twentieth steel fishing hull to the Wilson Shrimp Co. of Tampa which will outfit it for deep sea fishing. Christened the *Austin*, the 70 ft vessel will be powered by a General Motors 6-110 diesel, developing 300 hp.

J. FRANK Knorr of Miami supplied the engine room equipment on the twin screw, 41 ft, *Norseman* built by Chris Boat Yards. The model 6DAR 273 Buda diesels, rated 85 hp and 2.56:1 Capitol hydraulic gears, give the vessel a cruising speed of 14 mph at 2450 rpm.



The finest filters weren't good enough. So . . . Winslow made them even better!

Already the pioneer and basic patent holder for many of the most significant advances in fuel and lubricating oil filtration, Winslow once again demonstrates its leadership by introducing these seven new, lighter weight filters for automotive and industrial engines. Used singly or in multiples, at least one of these newly engineered filters will give your engine improved protection against the impurities found on lubricants, fuels, air, water and gases. More than ever, it pays to insist on Winslow. Here's why:

REDUCE EXCESSIVE HEAT IN LUBE OILS!

A properly installed Winslow Full-Flow Filter helps keep your lube oil cool in two ways: **First**, if installed externally or directly in the air stream from your fan, the filter provides air cooling for the oil. **Second**, the capacity of the filter, added to the capacity of your crankcase, means that with Winslow full-flow filtration you have a greater oil reservoir and therefore do a better job of ridding the engine of excessive oil heat.

GREATER GPM RANGE—Select the filter designed for your engine. With oil flowing freely through a filter of adequate capacity, your engine cannot suffer from lack of proper lubrication, nor will it overheat as readily.

CONTROLLED PRESSURE—You get more positive protection from Winslow Full-Flow Filters because of the patented "CP" Element, with its self-contained, dual capacity, Controlled Pressure flow.

LIGHTER WEIGHT—Profiting from experience gained in developing Winslow's famed aircraft engine filters, these new models are lighter in weight and thus easier to install.

ELEMENTS CHANGED EASILY—The specially designed clamp and "O" ring seal have made it possible to remove the filter lid more easily and change elements with less loss of time.

For complete information, write today to

WINSLOW

ENGINEERING & MANUFACTURING CO.
4069 Hollis Street, Oakland 8, California

AT FORT Lauderdale, the Intercoastal Dredging Company took delivery of 2DW-21 Caterpillar tractors with 470 scrapers plus a D8 Caterpillar tractor and a #12 grader. All from Shelley Tractor & Equipment Co.

THE *Robinhood*, a 38 ft flying bridge sports fisherman powered with two model DOOD 4 cyl. Hercules diesels rated 79 hp at 2600 rpm plus 1.5:1 Borg-Warner r&r gears, being built at Chris Boat Yards.

FOR EMERGENCY power used at the 4th Street pumping station, Miami, a #124 Murphy 6 cyl. diesel with two Donaldson air filters. The Columbia generator is rated 187 kva, 240/480 volts, 225/450 amps. Woodward governor and Synchro-start controls are used.

A MAYHEW, model 1000, dynamite drill rig with a Gardner-Denver air compressor plus a 6 cyl. 150 hp model H Cummins diesel for the Hooper Equipment Co. A rotor type drill is used; the average is 60 holes a day 30 ft deep. This is used in conjunction with a Caterpillar D318 dieselized Bucyrus-Erie transit crane.

IN THE new Miami Sewer System, 3 Fairbanks Morse model 38F5¼ diesels, rated 450 hp at 1200 rpm for the Fairbanks Morse 20 in. 10,000 gpm pumps, 4 Air-Maze oil bath air filters for each engine.

RECENT General Motors diesel installations included a model 6031-C in a Pulverizer & Mixer, for topping on road constructions, to Belcher Oil Company; the Sunshine Construction Company received a 6080 with a G. M. torque converter in a Koehring dragline and Bald Eagle Construction Co. took delivery of a Link-Belt Speeder with a 4055C installation.

DOWN AT Perrine, in the Redlands, the Perrine Equipment Co. received a mobile pumping unit powered with a D326 Caterpillar, radiator cooled, the Caterpillar power take-off, transmits the power to a Construction Machinery pump Rainmaster SS6H85 6 in. pump; for irrigation on a 40 acre farm; from Shelley Tractor & Equipment.

Elected To Board

Arthur McNeill, vice-president in charge of the Industrial Commercial Division, Wilco Company, Los Angeles, West Coast packager of chemical specialties, has been elected to Wilco's Board of Directors it was recently announced by J. A. McNeill, President of Wilco. Expanding under the leadership of Arthur McNeill, Wilco's Industrial-Commercial Division markets Sure Fire Motor Start-

ing Fluid throughout the United States and Canada. It supplies the aircraft industry with Wilco Anti-Static Plastic Cleaners and does custom packaging for many oil companies and other firms marketing non-food items. Other members of Wilco's Board of Directors include: G. W. Fitzpatrick, secretary; W. J. Whitfield, M. T. Flaxman and Curt Peacock.

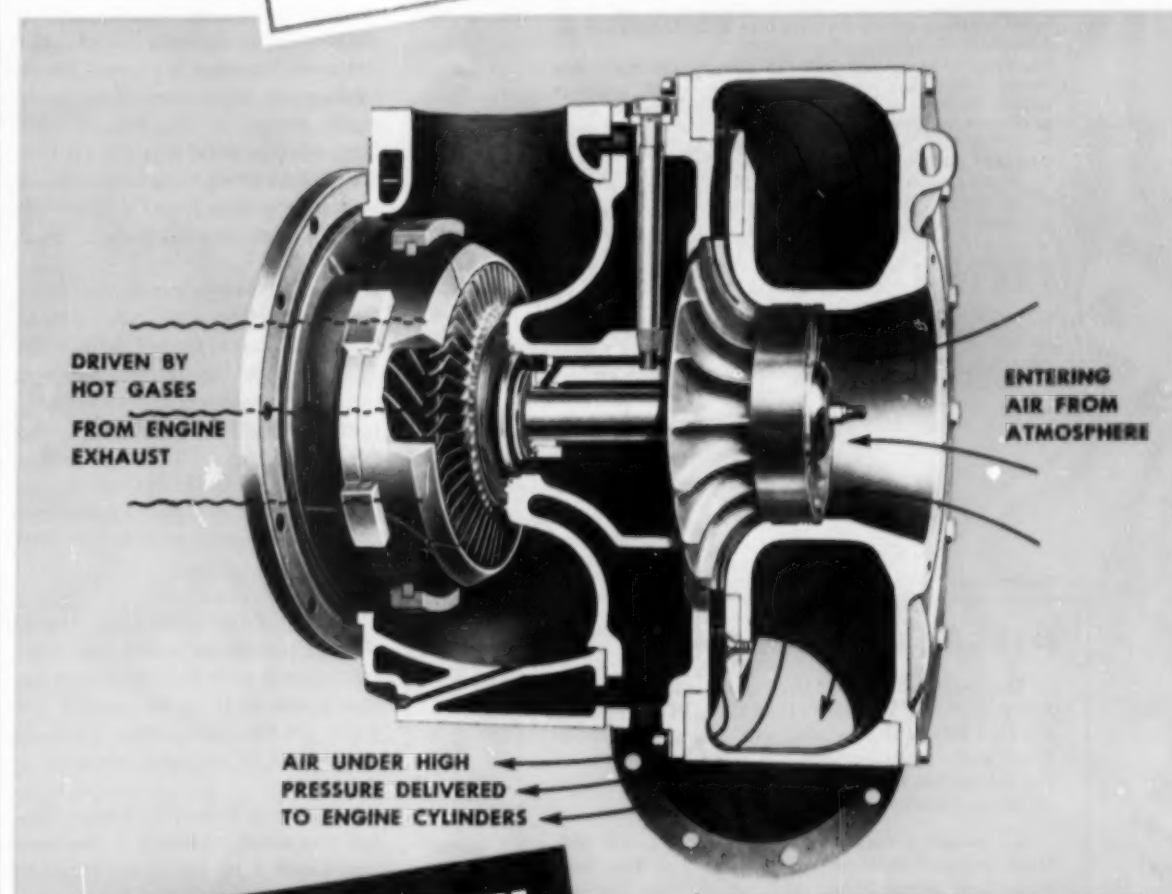
Sales Promotions

The following promotions in the sales department of Electro-Motive Division of General Motors are announced by V. E. Rennix, general sales manager: G. F. Greenip, from district sales representative to regional sales engineer, St. Louis; R. E. Hill, from sales engineer, La Grange, Ill., to district sales repre-

sentative, St. Louis; A. E. Roberts, district engineer, San Bernardino, Calif., to district sales representative, Chicago, and Paul C. Ganzer, district engineer to district sales representative, Chicago.

Never did make much sense to pay 25 grand for an engine then save 25 bucks on cheap lubrication and jack up the annual maintenance costs 25 hundred.

ELLIOTT EXHAUST GAS TURBOCHARGERS



**HIGHER DELIVERY PRESSURE
yields maximum engine
horsepower output**

**STURDY CONSTRUCTION
the result of 16 years of
turbocharger experience
—assures dependability**

For over 16 years, Elliott has been building and applying turbochargers to diesel engines, thereby improving their performance, output and operation. Over 15 million horsepower of diesel engines have been turbocharged by Elliott, covering all fields—stationary plants, large motorships and other vessels, railroad locomotives, trucks, tractors and off-highway automotive equipment, drilling rigs, etc.

Write your specifications to include ELLIOTT Turbochargers, and have the assurance of the dependability of this important engine auxiliary.

Complete information can be secured from your nearest Elliott District Office or from the Elliott Company, Supercharger Department, Jeannette, Pennsylvania.

ELLIOTT Company

ME-2

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

met the
PETTER DIESEL
family yet?



In the rugged PETTER diesel family are aircooled and water-cooled models all the way from 1½ hp (the toughest baby yet) to 48 hp. And long, faithful service is an old Petter family tradition; witness the more than 400,000 Petters in use throughout the world.

The Petter motto is "ubique" (we get around). You'll find Petters driving well pumps in the Persian Gulf, irrigation systems in India, marine auxiliaries in Louisiana, standby generators in Connecticut. There isn't a piece of powered equipment in its range for which a Petter can't do a better, dieselized job . . . cut running costs and fire risk.

For rugged power in junior sizes, check the Petter range today! Write for information—a few choice dealerships are still open.

PETTER DIESEL ENGINES



Division of BRUSH ABOE INC.
60-07 39th Ave., Woodside, L.I., N.Y.
Branch office: 3507 Stillman St., Jacksonville 7, Fla.

DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 21 of DIESEL ENGINE CATALOG which is now available, entirely revised and rewritten. This is the 21st edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the DIESEL ENGINE CATALOG gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him *all* data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Orders are now being accepted for this latest edition. Price \$10.00 prepaid.

Add California Sales Tax for Delivery in That State

DIESEL PROGRESS

816 NO. LA CIENEGA

LOS ANGELES 46, CALIFORNIA

Midwest Diesel News

By L. H. Houck

MILLER BROS. Construction Co., Kansas City, Kan., have two new pieces of diesel equipment on the Sixth St. Trafficway job, currently under construction. One is a Michigan Turbo-Dozer, powered by a Model 135DKBS, turbo-charged Waukesha diesel and the other is a Model 175 Michigan loader powered by a Model 135DKB Waukesha normally aspirated diesel. Chas. Dunn Machinery Co., Kansas City, sold the units.

AS THE drought continues to plague the farmers and cattle raisers of the Middle West, wells are being drilled deeper and more irrigation is planned for the future which means more diesels to run bigger pumps. E. D. Boc, Madison, Neb., recently installed a 250 hp Cummins NT-6-I diesel on an irrigation unit, buying the engine from Cummins Mid-West Co., Inc., Omaha, Neb.

R. G. ALDRIGE, contractor, Festus, Mo., recently put a No. 12 Caterpillar grader in service from Fabick & Co., Jefferson City, Mo. He also purchased from the same source a D8 Caterpillar tractor for a job at Steelville.

ALFRED SEATON, Springfield, Mo., livestock hauler, has placed a new truck in service powered with a 6-71 GMC diesel.

MARTIN TRACTOR CO., Topeka, Kansas, recently delivered two Caterpillar power units to Nelson Bros. Co., rock producers at La Harpe, Kan. One was a DC-343 power unit, while the other was a DC-337 generator unit.

LOCKJOINT PIPE CO., Turner, Kan., has repowered a Model 7 Northwest shovel with a 165 hp Model HRBI-600 Cummins diesel. Sale was completed by Cummins Kansas City Diesel Sales Corp., Kansas City, Mo.

CLOSE HATCHERIES, Springfield, Mo., are installing a 50 kw Waukesha Enginator for standby service. Unit is powered by Waukesha's Model 135GKU natural gas engine and the sale was made by AAA Engine & Electric, Inc., Waukesha distributor in Kansas City.

DON GRAY, Poplar Bluff, Mo., has purchased a Model 45 Allis-Chalmers motor grader from Chiles Tractor & Machinery Co., Springfield. The unit is powered with the new A-C (Buda) diesel. Gray is a highway contractor. He also bought an HD-16-A Allis-Chalmers diesel tractor.

HARBISON-WALKER Refractories

Co., Vandalia, Mo., one of the large fire brick producers, has added a Caterpillar D4 to its fleet of diesel equipment, from Fabick & Co., Jefferson City, Mo.

TWO 250 hp Model NT-6-BI Cummins diesels have been installed in a rock crushing plant owned by Daanen & Janzen, highway contractors, at DePere, Wis. Sale was completed by Cummins Diesel of Wisconsin, Inc., Milwaukee.

JOS. J. GRIESEMER quarry, Springfield, Mo., has added a Caterpillar D6 tractor with dozer to his large inventory of equipment. Not long ago he bought a Caterpillar No. 112 motor grader and now has 15 large diesel engines operating daily in his large limestone mining operation. A recent addition, too, was a 900 cu ft Chicago Pneumatic Power-Vane rotary air compressor powered by a GMC 6-110 2-cycle diesel.

GRANDVIEW air base, Grandview, Mo., has ordered a Waukesha 100 kw diesel Enginator for standby service in a hospital currently under construction. Engine in this unit is the Waukesha Model WAKD, 6 cyl. 1197 cu in. diesel. AAA Engine & Electric, Inc., Kansas City, Kan., made the sale.

OSAGE County Court at Linn, Mo., now has a D2 Caterpillar tractor with front end loader assigned to special district road work and bought from Fabick & Co., Jefferson City, Mo.

SEASTROM & CO., 2351 Kentucky Ave., Indianapolis, Ind., has been appointed Murphy diesel dealer for Indiana, and will handle sales in this area for the Murphy diesel in ranges from 96 to 264 hp and generator sets from 64 to 165 kw powered with Murphy diesels.

S. J. GROVES & Sons, nationally known contractors, had a high-powered array of diesel equipment on their Illinois road job which tied in U.S. 40 and U.S. 66. The excavation amounted to 500,000 yards and 8 GMC powered Euclid scrapers were used, along with Euclid TC-12 Twin Crawler for a push loader. Engines were all GMC diesels.

BRANDEIS Machinery & Supply Co., Louisville, Ky., put on a Road Show at the Kentucky State Fair and Exposition. With approximately \$1 million worth of machinery on display, mostly diesel, the exhibit was called the Million Dollar Acre. Brandeis has branches at Evansville, Ind., Paducah, Ky., and Middlesboro, Ky., and is distributor for International.

RICHARD BURR, Juniata, Neb., has bought a 165 hp Model HRP-600 Cummins diesel for connection to a 10-in.

Western Land Roller Pump for an irrigation well. Sale was made by Cummins Mid-West Co., Inc., Omaha.

PADGETT & SMITH Oak Flooring Co., Mountain View, Mo., has powered a Corley No. 4 sawmill with a 225 hp HRPS-600 Cummins diesel from Cummins Missouri Diesel Sales Corp., St. Louis.



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ILLINOIS TESTING LABORATORIES, INC.
Room 508, 420 N. La Salle St.,
Chicago 10, Illinois

ROBERT D. CANTRELL, Seymour, Mo., has bought an Allis-Chalmers HD-11-B Tractor from Chiles at Springfield, for custom work.

PERRY JONES, Carbondale, Kan., has bought a Caterpillar 318 unit from Martin Tractor Co., Topeka, for use in a rock plant which will furnish rip rap for the Toronto Dam. He also recently bought from the same firm two Caterpillar D9's to be used for stripping on the same job.

New Director

Election of Benjamin Tobin, Jr., to the Board of Directors of American M.A.R.C., Inc., Inglewood, California, is announced by W. Denis Kendall, president of the diesel engine manufacturing company. Tobin is president of Continental Sales & Service Co. of Los Angeles, the Western States distributor of Continental and Wisconsin industrial and automotive engines. His firm recently became Western distributor of American M.A.R.C.—Hallett-Diesel engines for industrial and marine markets.

According to Kendall, whose company last April purchased the diesel division of Hallett Manufacturing Co., pioneer builder of lightweight portable diesel engines, Mr. Tobin will take an active part in the sales activities of American M.A.R.C. Prior to forming Continental Sales & Service Co., Tobin was vice-president and a director of Continental Motors Corp. of Detroit. Current production of American M.A.R.C. engines includes both air and water cooled engine models that bring large diesel engine economy to the users of small engines. Recently ten American M.A.R.C. air-cooled engine-generator sets were shipped to Alaska for use as emergency power units.

Marketing Agreement

Nemec Combustion Engineers Inc. of Whittier, California, have long specialized in all types of combustion problems and have recently worked with railroads and other users of diesel engines in the extensive effort to utilize the cheaper heavier fuels. Engineering Controls Inc., Paul Brown Building, St. Louis, Mo., are the developers of Vapor Phase Heat Recovery Systems which are often used in a variety of ways with diesel engines and which are an important part of the system by which Bunker C Fuel oil recently has been successfully used in the operation of diesel engines in large towboats.

With parallel experience in the same field of developing the equipment and automatic controls needed for dual fuel oil systems, the two companies will

combine their efforts on the engineering and marketing of the equipment needed for all types of diesel engines. Additional sales information may be obtained from Engineering Controls Inc., Paul Brown Building, St. Louis 1, Missouri.

Marine Engine Distributor

Appointment of Diesel Control Corporation, Wilmington, as Los Angeles county direct factory marine distributor for the Buda Engine Division of Allis-Chalmers Mfg. Co., is announced by Stanley Franklin, president of Diesel Control. The line includes diesel propulsion engines ranging from 9 to 51 hp and a complete line of diesel generating plants for shipboard service. In addition to the Buda Division of Allis-Chalmers, Diesel Control Corp. is also distributor for American Bosch, Demco, Roosa-Master, and Bendix fuel injection equipment, and Winslow fuel and lubricating oil filters. The company recently moved into a new and larger plant at 226 North Marine Street, Wilmington, to provide room for an enlarged fuel system overhaul and servicing facility. Air-conditioned and temperature-controlled, their fuel system overhaul shops are the most extensive and complete of any on the West Coast. According to Franklin, Allis-Chalmers Buda engine sales activities to the pleasure and commercial trade will be under the direction of Leonard Grant, of Diesel Control Corp.

OGP Meeting Information

Timely engineering topics such as the conditioning of engine intake air (cleaning and cooling), and pressurizing of compressor stations will be presented during the three days of technical sessions at the Oil and Gas Power Division of the ASME annual meeting May 20th through 23rd, 1957 in Louisville, Kentucky. This event regularly attracts operations engineers from the various industries that use oil or gas power—shipping power plants, trucking, chemical and petroleum, earthmoving and pipeline activity. And these are the men whose preference in engines, auxiliaries, instrumentation and all other attendant operating equipment, influence their selection.

The 600 to 700 registration is predominantly made up of people looking for products in which to invest, to help them operate their industries more efficiently. They come to the meetings for a dual purpose—to get the utmost out of the technical sessions and also to examine the exhibits. In 1956 booth space was sold out and many late applicants were turned down. This year there is 20% more space available for the 1957 meeting, and it is urged that

those who wish to exhibit at the meeting get their orders in promptly.

It's interesting to see how some people worry over a few specks of rust on the outside of the engine and give little thought to what is going on in the water jackets where the real corrosion trouble occurs. Out of sight out of mind applies—period.



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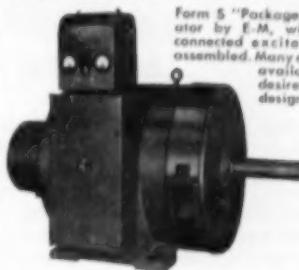


These "vest pocket" auxiliary power plants are operated by a large refining company. Such plants, comprising a diesel engine and a 100 kw E-M "Packaged" Generator, produce high-quality voltage right on the spot, for needs such as lighting, controls, communications, and even large pump motor starting and operation.

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☐ E-M Synchronizer No. 35, Generator Issue
(2100-TPA-2147)

Inland River Reports

By A. D. Burroughs

THE LOW water alarm, already a serious impediment to both shippers and carriers, has captured the major share of interest and efforts along inland rivers. Special focus is turned toward the Alton (Ill.) lock bottleneck, where a predicted depth of four feet is expected without immediate and plentiful rainfall.

NEW DIESEL towboats appear weekly, with the *Craig M*, 2560 hp boat completed at Dravo for A. L. Mechling Barge Lines scheduled for duty on the Illinois and upper Mississippi Rivers. With both beauty and power, this boat is a sister craft to the new *Lynn B*, powered by Enterprise engines.

AMERICAN Barge Lines' newest diesel addition is the new 3200 hp *Andrew P. Calhoun*, named for the recently re-

tired ABL executive vice-president. Measuring 160 x 34 x 12, main propulsion power is provided by twin 16 cyl. GM (Cleveland) engines Model 278-A. Falk reverse-reduction gears, Ingersoll Rand air compressors, Kahlenberg air horn add to the impressive equipment listing for this fine vessel built by Jeffboat.

ETHEL WOODS, 66 x 18½ x 6½ ft all-steel new towboat, powered by twin GM 6-110 engines, is another new feature on inland rivers, holding the distinction of being the first diesel towboat built on White River. It was constructed by Frank E. Woods, Woods Lumber Company, Inc., at Clarendon, Ark.

THE ALL-STEEL twin-screw *Dallas*, newest Coyle Lines fleet addition, along with the boat's master, Capt. Will Jones, has received numerous favorable comments. Recently built by Arnold V. Walker yards, with the 1170 hp provided by two Fairbanks-Morse engines,

this vessel is in service in the Gulf Intracoastal Waterway, Warrior, and lower Mississippi area.

CITY OF HUNTINGTON, newest Ohio River Company fleet addition, is a busy boat on the Ohio using the 2160 hp developed from Baldwin-Lima-Hamilton engines. Two Caterpillar generator sets, Falk reverse-reduction gears, Graham lube oil coolers, Hilco lube oil purifiers, Kahlenberg whistle are among the quality names included on the equipment listing for this St. Louis Ship production.

THE CHRISTMAS holidays are expected to see the next new Ohio River Company fleet addition now under construction at the St. Louis Shipbuilding and Steel Company. Reportedly to carry the name *Ovec*, this triple-screw towboat will be a sister craft to the *John J. Rowe*, also powered with Baldwin-Lima-Hamilton engines.

LOUISIANA visitors, like ourselves, are impressed with the state-owned, free-ferry service offered with the modern ferry boat *Feliciana*. This modern ferryboat plies her way across the Mississippi just north of New Orleans, with power provided by two Caterpillar diesel D375 naturally aspirated engines.

THE BLESSING of the Fleet at Morgan City, La., in early September was one of the most impressive services we've seen. A traditional service among the fishing fleets, held throughout the area, brought literally hundreds of fine diesel fishing vessels together for this beautiful ceremony.

THE 62-ft *Belle of Portugal*, delivered to Frank Fernandes by Diesel Engine Sales, Inc., has been the center of interest for the Bayou La Batre fisherman. Main propulsion power is provided by a 6-71 GM engine with an Allison reduction gear, and a Rockford power takeoff.

PROVING that it's a small world, one friend in Louisiana commercial fishing circles gave us a photo of the Seattle, Washington, salmon troller, the *Sandra*, a fine vessel owned by Waino J. Bloom, and recently repowered with a 105 hp Model JF-6-M Cummins diesel engine.

BACK in our home area, we saw the *Nicholas Duncan* in the Illinois waterway area. A long-popular towboat built in 1939 at Marietta, this 124.7 x 28 x 8.8 ft boat gets it 800 hp from Atlas engines.

OHIO RIVER traffic is steadily recovering from the steel strike, with the familiar *Jeffboat* with its 3000 hp developed by the Fairbanks-Morse op engines, and the ABL boat, *Jefferson*, with its 2000 hp furnished by Cooper-Bessemer

engines, seen regularly with work-size tows.

OBSERVED working between Destrehan (La.) and Mobile is the new towboat, *Chemical State*, operated by Capt. J. D. Cayton. Measuring 72 x 21 ft, built by Calmes, this neat worker is powered by two Caterpillar D 397 engines, rated at 450 hp each.

Sales Promotion Meeting

Some 45 officials and sales engineers of U. S. Steel's Oil Well Supply Division from throughout the United States and Canada gathered at the division's Witte Engine Works recently for a two-day sales promotion meeting. K. O. Nilsson, Witte general manager, said the purpose of the conference was to bring the representatives, who are responsible for sale of an important part of the plant's output, up to date on the plant's oil field engine models, acquainting them with recent developments and plans for the future. During the meeting the visitors viewed production lines, and operation and laboratory testing of the various models in addition to discussions of sales features.

The Witte plant, located at 1600 Oakland Avenue, Kansas City, Mo., is a pioneer in development of small heavy duty diesel engines and a supplier of these engines for both oil field and general industrial purposes. The plant also produces oil field pumps for secondary oil recovery. Hosting the meeting, besides Mr. Nilsson, were J. M. Hall, manager of oil field sales, and the plant's engineering and production sections. Heading the list of visitors were four officials from Oil Well Supply's Dallas, Texas headquarters, Alex Quayle, director of engineering; J. M. Haynes, manager of engine and compressor sales; J. S. Fuller, manager of production equipment sales, and William Miskimins, manager of Oilwell's central mid-west area.

Prime Mover Control Conference

More than 200 technical representatives from some of the largest companies in 31 of the United States and eight foreign countries attended the 20th Prime Mover Control Conference conducted by the Woodward Governor Company, Rockford, Illinois, September 4-7. A large contingent from the armed forces and other government agencies were in attendance. Visitors were registered from countries as far distant as Sweden and Indonesia. The conference is the largest source of technical information on hydraulic governor theory, application, maintenance and operation in the United States. It is open to domestic and foreign industries using hydraulic



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governors in their operations or as original equipment on their products, and to all branches of the government.

The sessions ranged from basic discussions and demonstrations to instruction on advanced technical subjects at the engineering level. After the opening conference on Governing of Prime Movers, special series of conferences were held on governors in each of the following fields: Hydraulic Turbines, Gas Turbines, Internal Combustion Engines, Steam Engines and Aircraft Propellers.

Diesel Ore Carrier

A \$6,000,000 contract has been awarded by Westriver Ore Transports Limited to Canadian Vickers, Ltd. for a 20,350 ton dead weight bulk ore carrier. The vessel will be the largest ocean going cargo carrier ever built in Canada and is scheduled for delivery in August, 1957. She will be 578 ft overall with a beam

of 72 ft and a 30 ft draft. The ship will be powered with a 6800 hp Nordberg two-cycle diesel marine engine. The engine will have eight cylinders of 29 in. bore and 40 in. stroke and operate at 167 rpm. The slow speed, heavy-duty, non-reversing Nordberg engine will be direct connected to a controllable pitch propeller. The propeller blade action eliminates the engine's need for direct reversing features and will contribute significantly to the successful operation of the propulsion machinery on heavy grade, low cost Bunker type fuels. This is among the significant improvements incorporated in the design of the new bulk carrier by Canadian Vickers and H. C. Downer and Associates, Naval Architects of Cleveland, Ohio.

Nordberg will also furnish two auxiliary engines for the ore carrier. They are four-cycle, six cylinder, supercharged engines, each rated 900 bhp at 450 rpm. These engines will be direct connected to 635 kw alternating current genera-

tors. Westriver Ore Transports, Limited of Montreal will operate the ship in the Canadian ore trade between Seven Isles and East Coast ports until the St. Lawrence Seaway is opened in 1959. The ship can then be brought into the Great Lakes. The Westriver Company is an affiliate of the Wilson Transit Co. of Cleveland which has been operating ships on the Great Lakes since 1872.

De Laval Sales Office

De Laval Steam Turbine Company, Trenton, N. J. has announced the opening of a new sales branch office in Moline, Illinois. H. A. Besocke has been appointed manager. Mr. Besocke has served in De Laval's Chicago district office since 1949. The new office is located at 1610 Fifth Avenue, Moline, Illinois.

West Coast News

By James Joseph

FOR FLOOD control work on Los Angeles' Washington street freeway, an Allis-Chalmers Model LO-525 natural gas engine, sold by Anderson-BeVier Co., Inc.

COMING for wind and sand harassed dozer drivers: a new, nearly unbreakable, hard-to-scratch plastic lens for safety goggles and sunglasses. Lens, the first of hard-resin plastic capable of being precision molded to corrected prescriptions is invention of Pasadena, Calif. optical physicist, Robert Graham.

YUCATAN, Mexico's Maderera del Tropico, S. A., has taken delivery of three Fairbanks-Morse model 38F5 $\frac{1}{4}$, 5 cylinder, 375 hp diesel engines.

TO THE U. S. Army, Ft. Baker, Calif., a Fairbanks-Morse Model 45B3 $\frac{1}{2}$, 5 $\frac{1}{4}$ hp diesel generator.

FOR OIL well pumping, four Allis-Chalmers Model HP-326 natural gas engines.

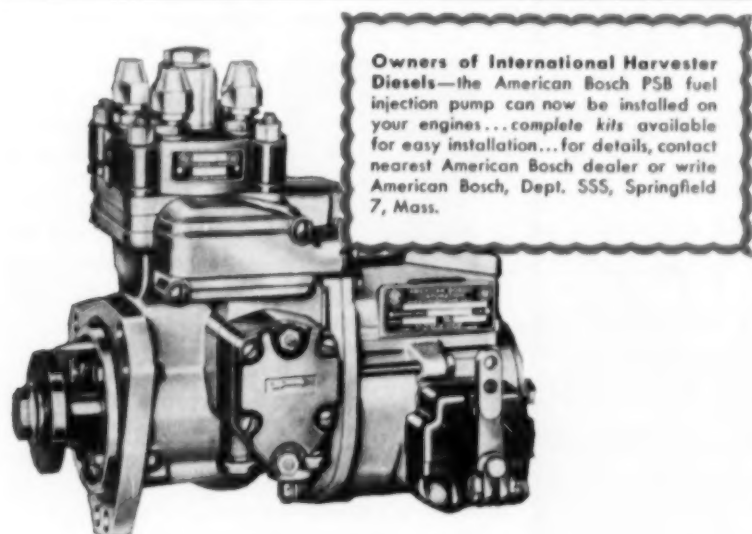
TO P. S. Pell & Co., Honolulu, a Fairbanks-Morse standard enclosed power unit (a Model 49C4 $\frac{1}{2}$, 90 hp, 3-cylinder).

DELIVERED to Merritt, Chapman & Scott Corp., Ephrata, Wash., a Fairbanks-Morse Model 38F5 $\frac{1}{4}$, 450 hp, 6-cylinder generator set.

FOR irrigation pumping, an Allis-Chalmers Model PC-2505 natural gas engine . . . sale via Anderson-BeVier Co., Inc., Los Angeles.

ALTADENA, Calif.'s Henry Brucher, metallurgist and technical translator (his

translations have been important contribution to what we know of Russian heavy-industrial progress), reports revolutionary new Russian method for continuously inspecting heavy-stressed welds (i.e. in diesel equipment, on many a boiler, gas conduit and bridge construction job). Used: a magnetic tape which records flaws, identifies any exceeding pre-given size via special projection set-up.



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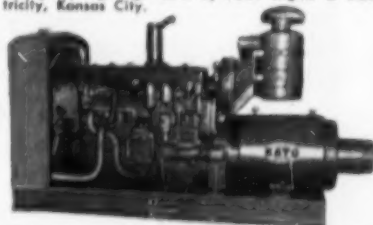
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U.S. AIRFORCE BASE, Grandview, Mo. uses 75 KW, 93.8 KVA, 120/240V., 60 cycle, single phase, 1800 RPM KATO Generator, driven by P & H Hornischfeger Model 487.18 diesel engine, for emergency lighting. Sold by AAA Engine & Electricity, Kansas City.



BOEING AIRPLANE CO., Seattle, Wash., purchased 175 KW, 219 KVA, 3 phase, 3 wire, 60 cycle, 1800 RPM, revolving field type KATO Generator, General Motors Model 62403-BA diesel engine. Installed by Star Machinery Company, Seattle.



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• D.C. GENERATORS to 45 KW at 1000 rpm.
• ROTARY CONVERTERS D.C. to A.C. to 5 KVA at 3600 rpm.
• D.C. MOTORS 3 phase induction to 90 H.P.
• D.C. MOTORS 3 phase synchronous to 150 H.P.
• D.C. MOTORS single phase—1 $\frac{1}{2}$, 3, 5, 7.5 H.P.
• D.C. MOTORS to 10 H.P. or larger
• D.C. MOTORS with A.C. (output) taken.

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A pipeline operator writes about DIESEL ENGINE CATALOG Volume 21 . . . "The information and data presented in this volume is, as in previous volumes, invaluable to us in keeping informed of the diesel equipment being built and placed on the market."

An accessory manufacturer writes . . . "The completeness of this Catalog is valuable to us in our efforts to adapt our products to the various engines manufactured, particularly in regard to gathering engine torque specifications."

A design engineer writes . . . "I have examined Volume 21 completely from cover to cover, and can only say I would not think it possible to make so many additions and improvements over last year's Edition. This issue certainly more than lives up to its reputation of completeness of presentation and attractive make up."

DIESEL ENGINE CATALOG

Volume Twenty-One

DIESEL ENGINE CATALOG can serve you too as it is serving thousands of diesel men. Whether you buy, sell, repair or service diesel, dual-fuel or gas engines, you need DIESEL ENGINE CATALOG, Volume 21.

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TOMORROW — ALCO "World" diesel-electric locomotives, such as this one hauling a passenger train in Spain, soon will be pulling trains of the Southern and Central Railway of Peru over the Andes Mountains. The locomotives are considered by the railroad to be well adapted to high-altitude operation by virtue of their four-cycle, turbosupercharged ALCO 1800-hp engines and their dynamic brake capacity. The Southern and Central Railway is the highest standard-gauge line in the world, with track elevations reaching 14,666 feet in the lofty Andes.

Dynamatic Sales Manager



James M. Adair

The appointment of James MacCracken Adair as sales manager of the Dynamatic Division of the Eaton Manufacturing Company in Kenosha, Wisconsin, effective November 1, 1956, was announced by F. L. Hopf, general manager of this division. The new Dynamatic Division sales executive replaced G. E. Walk who has resigned. Mr. Adair formerly was sales manager of The Electric Motor Division of The Hoover Company in North Plainfield, N.J., a position which he held since January, 1953. Prior to that he was sales manager of the Star-Kimble Motor Division of Miehe Printing Press and Manufacturing Company.

Landis Promoted by De Laval



Dick M. Landis

C. B. Schmidt, President of the De Laval Separator Company, has announced the appointment of Dick M. Landis to the position of Assistant General Manager of the De Laval Pacific Company. A native Californian, Mr. Landis has been associated with De Laval since 1937 when he joined the Company as a sales engineer. In 1945 he was made Manager of Industrial Sales for the De Laval Pacific Company. He was promoted to Assistant Manager of the Company's Industrial Division in New York in 1949 and in 1952 was appointed Manager of the Marine Division.

Mr. Landis holds an electrical engineering degree from the University of California. He has been active in many national engineering organizations including the Society of Naval Architects and Ma-

rine Engineers, the American Society of Mechanical Engineers and the American Society of Lubrication Engineers. He is also a Registered Professional Engineer.

Chief Engineer



R. H. Beadle

Fairbanks, Morse & Co. announces the appointment of R. H. Beadle to the position of Chief Engineer, Diesel Engineering Department, with his headquarters at the Beloit, Wisconsin, works of the company. Mr. Beadle has been associated with Fairbanks, Morse & Co. since 1939, specializing in the diesel engineering field. During this time he served in various engineering capacities, and prior to his present promotion held the position of Assistant Superintendent and Superintendent of the Diesel Experimental Department.

His thorough knowledge of the company's entire diesel product line and his ability to analyze difficult engineering problems are among the outstanding qualifications he brings to his assignment. Mr. Beadle replaces Mr. E. L. Dahlund who recently resigned to accept an executive position with another company not connected with the diesel industry.

J. S. Dale Joins Marquette



Joseph S. Dale

Joseph S. Dale, formerly with Dale Hydraulics Controls, Inc., and Woodward Governor Company, has joined the Engineering Staff of Curtiss-Wright Corporation, Marquette Metal Products Division, Cleveland, Ohio. His principal work will pertain to hydraulic governor development and design. Mr. Dale brings many years of experience in the design and application of hydraulic governors to diesel engines with him in this new position.

Manager of Marine Sales



Durrett Hendrix

Durrett Hendrix has been named Manager of the Texas Company's Marine Sales Division, it was announced recently by S. C. Bartlett, Vice President in charge of Texaco's Domestic Sales Department. His headquarters have been transferred from Houston, Texas, where he was Assistant Manager of the Sales Department's 11-state Southern Territory, to New York. Mr. Hendrix succeeds Joseph H. Moran, who was appointed Director of Trade Relations for the Company.

Mr. Hendrix joined The Texas Company's Marine Department in 1919 and served as a Chief

Engineer aboard Company vessels until 1926. That year he was transferred to the Domestic Sales Department at New Orleans as a Lubrication Engineer. He was appointed Assistant Manager of the four-state New Orleans Sales Division in 1933, and Division Manager in 1938. In 1943 he became Assistant Manager (Administration) of the Marine Department. He was named Assistant Manager of the Company's Southern Sales Territory in 1945.

Purolator Appointments



Frederick R. Gruner



Herbert R. Otto, Jr.

Creation of a new Technical Service Department and appointment of a new Chief Engineer for Purolator Products, Inc., filter manufacturers of Rahway, N. J. has been announced by James D. Abeles, President. The new Service Department, to be headed by Herbert R. Otto, Jr., formerly Chief Engineer for the company, is designed to pro-

vide fast field sales engineering service to Purolator's major accounts in the automotive, farm equipment, industrial, aviation, petroleum and other fields.

Named to succeed Mr. Otto as Chief Engineer for Purolator Products, Inc. is Frederick R. Gruner, formerly Vice President in Charge of Operations for the Warren Foundry and Pipe Corporation of Dover, N. J., and prior to that for many years in various engineering and managerial capacities with the Allis-Chalmers Manufacturing Co. Mr. Gruner holds a Bachelor of Science degree in Electrical Engineering from Cooper Union School of Engineering and a Masters degree in Mechanical Engineering from Massachusetts Institute of Technology.

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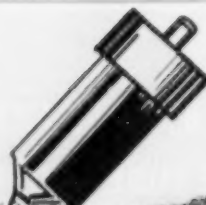
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